

Editorial

Hello all,

I'll start by giving our apologies for the late arrival of Retro Review's issue 3! Both Ian and myself were pretty busy these last months and since Retro Review is published on a hobby basis we had to postpone the release of this number! It is my belief that it's better to delay than to publish crap and low content magazine articles, so here we are! As a treat to you we added 4 more pages to the magazine- lets see if we can keep this number in further issues.

Another sad story was AmiWest's low numbers this year. Harv Laser was there and gave us his permission to print his review. Amiwest just reinforced the postpone factor that is hovering above Amiga One's release- what can we say except we are used to it.... The Amiga one is not in the scope of this magazine, but since we cherish the Amiga so much we can always find a space in here. The question goes to the potential buyers- will people give their hard earned money to buy it? Is the Amiga One a true Amiga ? I believe that the Amiga One will never be an Amiga as we call it, mainly because of the disruption these 15 years made on the product continuity. Would you give the same name to a Schneider PC1 and to a new Compaq machine? Are they the same? Doubt it, but the PC has the continuity factor on its side. Well enough of sad stories.

Now for good news, we wish to thank our collaborators! Retro Review this time features 3 articles by people outside of our Magazine so here is a BIG THANK YOU TO:

João Encarnado : Wrote the Timex FDD 3000 Piece.

Harv Laser : Wrote the Amiwest Report.

Finally we are pleased to announce the arrival of a new member to the Retro Review Team, James Alexander will be our Atari Writer, see his article Atari Groups on this issue.

Also if you're near the NEC in Birmingham (UK) around the 21st and 22nd September, Micro Mart will be hosting a show and they've asked Shawn Bebbington (who writes the Retro Mart column) to host a stand there. Guess who he's asked to help supply the computers and look after the stalls! So expect to see Ian showing off his Commodore MAX while surreptitiously offering copies of RetroReview to visitors!

Hope to see you next issue, this time sooner - thanks for your patience!

Jorge Canelhas

Ian Gledhill

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in this month Retro Review

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in this new series

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ground-breaking game of 1982 - the first to
fill our arcades with machines that talk back!



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Hello and welcome to this new section
of Retro Review! *Taming the Hardware*
deals with hardware projects, most of
them involving the soldering iron and
messing with your hardware (see the
small print to save us from any
liabilities!). Jorge Canelhas will cover as
many machines and projects as
possible, and of course you can
contribute with your own projects/ideas
(see *How to Contribute*).

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Jorge Canelhas Interviews the one and
only Sprinter Team, the dudes from
Russia who brought the ZX Spectrum
back to live.

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AUCTION WATCH

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When I took my first look at a picture of Timex FDD system, I asked myself: What are the 3 boxes? What do they do? Where is the disk drive? Now that I know what the Timex FDD really is, I understand that it is more than a disk interface...

Timex FDD 3000



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Chaos



Some games are fated to be played over and over again - and *Chaos* is definitely one of them. *Ian Gledhill* fires up his most often used Wafadrive cartridge on his Speccy for a bit of good old-fashioned Wizard-bashing...

Page 42 SPC Magazine

Germany is without question one of the countries where the ZX Spectrum has the greatest number of addicts! After contacting Wolfgang, he sent us some copies of SPC Koln Magazine- here we will take a look at it.

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AmiWest 2002

For the fifth time, the Amiwest show went on in Sacramento. Harv Laser from Amigazone sent us his report on the show.

News and Highlights

SUC Session finally in English

The German ZX Spectrum Magazine SUC Session, formerly only published in German, is now being published both in German and in English. The magazine can be bought either in paper or PDF formats and there is a cover disk/tape scene+ that can be purchased separately. Info can be found on Sintech's site <http://www.sintech-shop.de>.

It's noteworthy that the Spectrum User Club is one of the oldest clubs around and the number 188 of this mag demonstrates that quite well; besides, Sintech is always a good reference on ZX Spectrum stuff.

Read more about this in our review of the mag in this issue of Retro Review.



Apple 1 sold for 14 Thousand Dollars

Reading classic Tech Eletter (Subscribe to it on <http://www.vintage.org> - it's free!), one article caught my eye - this very very very rare Apple 1: and hey it's for auction! Of course, unless you are a very rich person I doubt you could afford it, as the auction started at 2000 USD and finished at 14K. That's a lot for a computer, right? Well, considering that there are probably only 50 of these machines in the world and that



this computer was the leap between a switch controlled home computer and the microcomputer form as we know it, probably not. Anyway, the lucky winner went home with no less than: "Apple Computer 1" Motherboard, Cassette Interface Board, Cassette Interface Manual, Preliminary Apple BASIC Users Manual (photocopy), Apple-1 BASIC on Cassette (copy), Original Apple-1 Advertisement (photocopy), 9" Monochrome Display, Apple II Parallel Keyboard and Cable, Power supply.

According to vintage.org : *Few Apple-1 computers come up for auction as very few still remain in existence. Only 200 Apple-1 computers were ever produced. Most Apple-1's sold by the Apple Computer Company were traded in when the Apple II computer was announced. Of the machines that were traded-in, only one was known to have been rescued. If you're an avid computer collector and have been looking for*

an Apple-1 to add to your collection, you do not want to pass this auction up. Just for the trivia, the machine costed 666.66 USD when it was launched back in 1976 (i was 2 years old...) and I really doubt you will see another for sale soon (even on eBay)!

Hyperion Software releases screenshots of Amiga OS4

Crikey, something to look at! Hyperion Software decided to present us with a preview of what Amiga OS4.0 will look like. According to them these are not final pictures, and many more enhancements will be made. For now we have a cool-looking Workbench, and loads of customisable menus that include solid, transparent, round edged and so on. Hyperion states clearly that these are included into Intuition, they are not any kind of external enhancement. Take a look at the Hyperion home page at <http://www.os4.hyperion-software.com>, it really is worth a look - now lets hope OS4 brings us Amiga users loads of stuff new. Of course we still have to wait, but Amiga users are used to that.

On Top a screen preview (notice the transparent menu), on the right a preview of round edged menus of OS4.



Vernalelm sells cheap 68060 CPUs



Ever wanted to upgrade that Cyberstorm card to a 060 ? Is your Atari demanding more power? This is probably the best chance to get a cheap 060 you'll have! Don't ask me how, but I stumbled on <http://www.vernalelm.com> and found them to be selling full, yes, *full* 68060 CPU for 95 USD plus shipping.

Useful especially if you can find processorless accelerators on ebay, as these go much cheaper than the ones with processor.

MAME.dk removes all ROMs

Predictably enough, MAME.dk, the arcade emulation site boasting ROM dumps of all the ROMs, has been asked to remove all of its ROMs with immediate effect. In the meantime we'd recommend using another site such as <http://www.roms.co.za> - not as comprehensive but still a fair amount there. Most MAME ROMs can still be found but it's a great shame that the largest site has gone. Maybe one day a site similar to Back to the Roots (www.back2roots.org) will be created for Arcade ROMs too.

MAME .DK



Cart Commander

*an
online
database?*

One thing most people reading this will have in common is an unusually large collection of carts and tapes for various systems! Cart Commander is a cartware program that allows you to hold a database of hard- and software that you own, and publish lists. We at *RetroReview* have been thinking of allowing subscribers to keep Cart Commander lists on our website, making it very easy for our subscribers to see what people own and trade with each other. Of course this would take some development time - so if you think this is a good idea let us know and we'll put the wheels in motion to get started!



Thunder in the Deep

Thunder in the deep will be Sprinter Teams next game, a Platformer showing the capabilities of the wonderful computer the Sprinter is, a new Graphics mode will be coded to support it, i just cant wait to get the demo that they will publish this month, keep your eyes opened and keep looking at

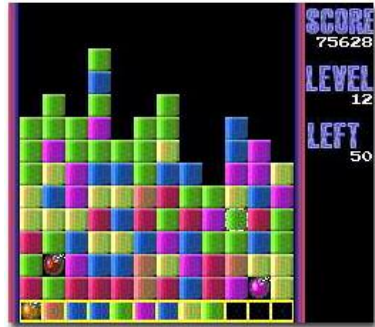
<http://www.petersplus.com>

Back after nine years - the PC Engine returns!

The first home-brew commercial release for the PC-Engine / TurboGrafx, "Implode" is in beta-testing and will be released shortly! *PCEngineFX.com* has an interview with the author - check it out to see what they've gone through to bring this to a commercial release.

While you're there take a gander at what else they've got there, including a PC-Engine based Radio station!

<http://www.pceenginefx.com>



Retro Review Wants to hear from you !!!

Hi! did you know you can send us your own news ?

No? Ok, then it must be our fault! let us give you our addresses:

By email:

ideas@retroreview.com - For your ideas, comments etc.

subs@retroreview.com - Subscriptions related mails.

help@retroreview.com - For any doubt you may have.

If you dont have email, you can send us a Letter at:

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Go ahead and tell us about yourselves, and don't forget to visit our Forum at <http://www.retroreview.com>.

D.I.Y. Emulation

Part 1 - a body for the brain...

Ever wished you could write your own emulator like those other guys seem able to do? It's not as tricky as you think - Ian Gledhill starts to break the back of the problems you may face when creating the next great emulator...

Chances are that if you're reading this then you not only have an emulator for your favourite machine, but also numerous others too. But what about that *really rare* machine you've got that no emulator writers seem to have (yes, there are some machines still unemulated, despite M.E.S.S.!)? All you need is a reasonable knowledge of your chosen language - or even a basic knowledge, as writing a program is the best way to learn a language.

For the purposes of this article, we'll be discussing the trusty Speccy, as it's very well supported emulator-wise but is a wonderfully simple machine. It also has a load of loyal followers who are usually eager to help people discover the joys of their favourite rubber-keyed friend, particularly if you promise something in return (which involves sacrificing a Commodore 64 to a god - any god will do as long as the '64 goes - if you ask for help from comp.sys.sinclair. They're very partisan like that!). As for what language you write it in, any will do. Write your ZX81 emulator on your Speccy if you like. I'll just be talking about theories, using a Speccy as an example, not actual specific code.

But aren't computers really complicated?

Simple answer - not usually! Of course if you want your first attempt at an emulator to involve a Sega Saturn or an Amiga then yes, they are (but once you can do a simple machine there's not much more to know - just extend the knowledge you already have). But take your average Speccy, CPU, RAM, ROM and ULA. That's basically it as far as we're concerned. We've got the CPU - like all computers have, the RAM (again, all have RAM), the ROM - although if you're emulating a console you may not have this- and the display processor, which on a Speccy is just a ULA (Unified Logic Array). There's likely to be an input/output chip too, but in this case the ULA manages that.

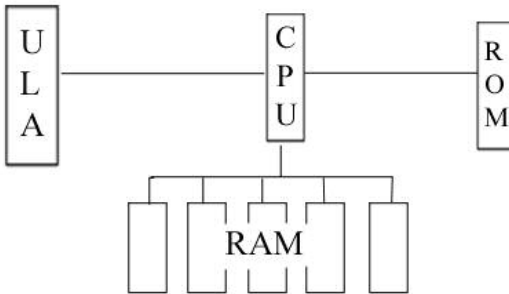
Time to start - Creation of a 'computer'

When you're writing an emulator, you're writing it on a machine with its own RAM, so emulating that isn't a problem - allocate your RAM using malloc() or whatever your language's equivalent is. For instance:


```
byte *MemoryBase = malloc(65536);
```

will allocate all your memory for a 48K Speccy. But isn't that 64K, whereas a Speccy has 48K RAM? Yes. But as far as the Speccy is concerned it's a 64K machine, it's just that it can't write to the lower 16K, which is the ROM. So, a snippet of code would:

Allocate 64KB (65536 bytes)



This is all of the computer we're interested in. It doesn't look quite so frightening now. Especially given that the ROM and the RAM practically sort themselves out...

- Open a file (i.e. "spectrum.rom")
- Read the file contents into the allocated address space.
- Close the file.

We now have our memory bank, as far as the Speccy is aware! The Speccy ROM is 16KB in length, so the memory map now holds 16K of actual Spectrum ROM, and 48KB of garbage - just like a real Speccy when it's powered on, in other words.

One part down, two to go....

The next part will usually be either the CPU or the display - just preference really. If you do the CPU first then it's not always easy to see if something isn't working right, so I chose to do the screen first. Of course if you're using someone else's CPU core like many

people do (particularly Marat Fayzullin's Z80 core) then the screen is most of what's left to do! If you're emulating something weird chances are you can't use another CPU core as it doesn't exist: also you may not want to use ANSI C so your choices are limited there too.

The screen handling is the most machine-specific part of the emulator. In this respect the Spectrum is very

different to most other machines. The theory behind them is common to most machines but different architectures use a different memory map. The Speccy one, naturally, is completely bizarre. If you've ever loaded a Spectrum game from tape then you know how the Spectrum sees its

screen memory map - it's split into three segments of 32x8, making a 32x24 screen. The first 256 bytes each signify the first line of each character square in the segment, the second 256 the second line. So to set the top three lines of the first character to solid black (the screen starts at 16384 on a Speccy, by the way - directly after the ROM):

```
POKE 16384,255
POKE 16384+256,255
POKE 16384+256*2,255
```

255 is BIN 11111111 : i.e. set all pixels to foreground colour.

Equally, to set the fourth line of character (x=5,y=2) to background (white at first):

```
POKE 16384+5*32+(4-1)*256,0
```

If you want to set character ($x=5, y=12$), you need to use the fourth line of the second segment, so (each segment is $8*256 = 2048$) we want to poke $16384+5+4*32+(4-1)*256+2048$

So that's how the Speccy deals with the screen, but how do we deal with it?

Usually our screen will in fact be a $256*192$ bitmap (we can worry about borders and things later on). So once we've allocated our bitmap we just need to translate between the two.

Our screen update routine can work in one of a number of ways. Either

tight loop is possible as long as we check for certain positions, like the end of a line of pixels. Figure 1 has some pseudo-code which can do this.

Yes, it's complicated. But at least there's no dedicated sprite hardware! In fact that are many ways of doing the screen update. You could just write a routine to translate Speccy offset into bitmap offset. It'd be slower (or more memory hungry if you use a look-up table) but simpler.

Figure 2 illustrates this rather simple method.

Figure 1.

```

Loop until the screen is done
  Add 1 to the bitmap (destination) pointer and the Spectrum
  memory (source) pointer.
  Are we at the end of the segment (i.e. the character number is
  divisible by 2048 (=$800))?
    If so - ignore all following checks! We're in the right
    place, so loop around.
  Are we at the beginning of the next Spectrum character line
  (i.e. character number is divisible by 32 :  $c \& \$1F = 0$ )?
    If so, put the destination pointer at the beginning of the
    next character square - i.e. 7 pixels lower.
  Are we at the beginning of the next Spectrum pixel line
  (divisible by  $32*8=256$  : i.e.  $c \& \$FF = 0$ )?
    If so, put the destination pointer at the second pixel
    line of the first character in the segment (which is 63
    lines above current position, as by now we're on line 64
    of the segment and we want to be on line 1, the first time
    round).
End Loop

```

Some pseudo-code to iterate through Spectrum memory, and move the host-bitmap pointer according to the pattern described by the Spectrum memory pattern.

go through the Spectrum memory byte by byte, putting the contents in the right place in our native bitmap (the one native to our host platform), or the other way around, and through our host bitmap pixel by pixel, updating according to the 'Spectrum's' memory. As in most languages, pointers are faster than random access, it's faster to keep two pointers: one for the source pixel, one for the destination. So a nice

The next thing to remember is what value to use when updating your host bitmap. Very few machines these days use more than one pixel per byte, so we need to translate this too. In fact, the easiest way is to write a routine to convert a byte to 8 bytes (see Figure 3). Now we can set our 8 bytes on our 'screen' bitmap by using a colour from a palette according to the foreground/background colour of the

square we're using. For instance, if we have the value 160 in the Spectrum memory location 16384 (the top left corner) then looking at the binary representation of 160, we see

Figure 2

```

Loop until Screen is done
  Increment source pointer
  Get destination pointer
  set the value
End Loop

```

Doesn't that look nicer? Of course you still need to write a function to convert from Spectrum memory offset (x,y) to host bitmap offset (x,y) - but if you can spare 16KB then a lookup table would do the trick, and be dead fast in the process.

%10100000, so we know to update the first and third pixels of our host bitmap.

Once we have our bitmap sorted, we just need to work out our colours. On a Speccy, at the end of the bitmap data is the colour data, using the top 2 bits for flash and bright, the lowest three for the foreground colour, and the other three for the background colour. So when we set the pixels on our screen bitmap, need to use the colour data stored at $16384+6144+(y*32+x)$ - no

Figure 3

A routine to take a Spectrum screen byte and convert it to something useful...

```

OutputBit0 = (source & $80) >> 7
OutputBit1 = (source & $40) >> 6
OutputBit2 = (source & $20) >> 5
..
OutputBit7 = (source & $01) >> 0

```

And now OutputBitx holds the pixel value - OutputBit0 is the top left, OutputBit 7 the top right.

silly segments here. If we have a '1' for a particular bit, set it to the foreground colour. If not, set the pixel to the background colour. If the bright bit is set use bright versions of the RGB values you're using to represent the emulated

machine's palette.

We can now test our screen is working! If we write a small program on a Speccy to copy the ROM into location 16384 onwards, we'll be faced with what looks like nonsense. However, it's *consistent* nonsense, and our screen can do the same! All we need to do is load the Spectrum ROM in our emulator into the Screen memory instead of or as well as the actual ROM space - i.e. load it into (Spectrum memory+16384). We should have both screens looking identical!

And now for our final major trick...

The CPU is the next step. Once our CPU is done we should be faced with the familiar copyright message. Unfortunately there's no room for this in this issue so we'll be covering the CPU emulation next issue. Until then, a good idea is to take a look at how other emulators work with their CPU's: xzx-pro is a good one for this, as it has a disassembler. Also RealSpectrum if your

machine can run it will work well. Remember, though - there's no magic in a CPU it's just bit manipulation and program flow!

Next issue we'll be working on just the CPU - after that we'll sort out our keyboard and other i/o devices - it's fairly simple to fool the 'Speccy' into thinking a key is being

pressed - initial sound code will also be started in the third instalment. In the meantime - let us know what you think - is this article too general? Too specific? Too techie?

This issue *Ian Gledhill* takes a look at a ground-breaking game of 1982 - the first to fill our arcades with machines that talk back! One of the classic uncompletable arcade games, *Berzerk* will remain popular for some time... but



Berzerk

Many people when asked if they remember “that game with the robots and the smiley face that chases you” will know the asker is thinking of *Berzerk*.... but to many that's not the arcade version but the Atari 2600 version - which holds many differences to the arcade.. so here's a quick review of the arcade version!

The game pretext is very simple - you're in a maze populated by not-so-friendly robots. You have to blow up as many of them as possible. Luckily the robots in question are rather - no, make that *very* - dumb. Give them a nice wall to walk into (which, incidentally, have approximately 240 million volts running through them) and they're swiftly despatched to robot heaven. Naturally as a humanoid you make a pretty good ground terminal too, so touch them and it's a free cremation for you.

There's more to the game than just running around a maze avoiding robots, though, oh yes- you've got a gun with which to zap the evil-doers. It's handily just powerful enough to waste your average droid, so some careful shooting will result in a nice robot-free arena. That's the good news. The bad news is that the robots also have their own armaments with which to waste *you*. Needless to say, one zap from one of them, and you've gone the way of the

dodo. It might be worth pointing out here to any Atari 2600 owners that herein lies a large difference between the VCS and the Arcade versions - here the bad guys *can* fire diagonally!

Not all robots are 'born' equal, though - in the same way as *Joust*, for instance, some robots are more dangerous than others, and are coloured differently to show this. However, in *Berzerk*, all the robots on whatever screen are the same colour. This results in some nice easy arenas, where the robots are lethargic at best... and then you walk into the next arena and they're all light blue - trouble! As you progress further into the game, the robots get deadlier and deadlier, until there's a large amount of luck deciding how long you live. There are ways and means of avoiding a premature end - for instance, always leave the arena from the top so there's less chance of starting next to a particularly mean robot with an acute attitude problem. You're still going to be caught out sometimes, though - a fluke shot from a droid is going to happen occasionally.

As luck would have it, you're not alone in the maze with these rather dense (albeit sometimes fortunate) automatons - there's another character called Otto who makes a regular appearance. Unfortunately, it's bad luck you have,

INTRUDER ALERT!!

and Otto's full name is *Evil Otto* (he's actually named after a staff member of Stern Electronics). You know that big white ball in *The Prisoner* TV series? He's like that - only with a big 'friendly' smile. Similarly, you can't kill Otto, he's unstoppable. He is, however, avoidable, so if he appears best bet is to run for the nearest exit.

Given this gameplay - which is very fine - probably the thing the game will be remembered for, at least in the arcades, was the speech. *Berzerk* is littered with short monologues from the androids in the maze. Of course there aren't *that* many speeches, as it cost about \$10,000 to sample each short sentence apparently, but there's a good variety. And anyway, any robot dumb enough to walk into a wall probably isn't going to have an 'A' level in elocution. Still the occasional "Die Humanoid" and "Intruder Alert!" does add to the flavour of the game - plus somehow it seems right that the arena should fill with the sound of "Ha ha humanoid! Ha ha intruder" when you join the choir invisible.

Finding a copy of *Berzerk* to play on an emulator is easy - MAME is the obvious one, and the arcade version is the best version, as usual. However, if

you have an Atari 5200, the home version is almost as good! Be warned, though, that the emulators I've tried to run 5200 *Berzerk* on don't support the speech - the 5200 itself does, and the real cart has at least most of the speech, in some cases clearer than the original arcade machine. If you just want a taste of the game, try the Atari 2600 version by all means, but it's not the same game as the arcade and 5200 versions (although still rather fun!). One final word of warning, though - if you get the Atari 5200 version, don't expect the controllers to fit the game well, they don't - they take a fair amount of getting used to, believe me!

Ian Gledhill

Berzerk- Stern Electronics	
Graphics	6
Sound	9
Playability	9
Longevity	8
Overall	8



How handy that the robots are daft enough to walk into walls.. just make sure you don't do the same!

Finding *Berzerk*

Getting hold of *Berzerk* is easy, as long as you don't mind the fact that technically you're stealing if you download the arcade ROM without owning the PCB. If that doesn't bother you, you can get it from <http://www.roms.co.za>, but make sure you download the sample set too otherwise you won't hear the lovely sound effects. Perhaps the best legal way, however, is to buy an Atari 5200 and run that version, but of course no emulator I've found can run that properly....

Taming the Hardware

Hello and welcome to this new section of Retro Review! *Taming the Hardware* deals with hardware projects, most of them involving the soldering iron and messing with your hardware (see the small print to save us from any liabilities!). Jorge Canelhas will cover as many machines and projects as possible, and of course you can contribute with your own projects/ideas (see *How to Contribute*).

It was a bit hard for us to decide what to put in this issue, mainly because we have no idea of the hardware knowledge of our readers (again your feedback is important), so I decided to start with something really simple and useful to many readers. Although the project itself is aimed at the ZX Spectrum, it will be easy to port to other machines that have a processor bus like the Speccy. The project this issue is a simple 'OUT to Light' project and can be used as a basis for many many other projects. It will also give to the less knowledgeable reader the basics on ports and addressing. To make this project you will need:

- 1 - Spectrum Edge Connector (it can be made out of a PC ISA bus)
- 1 - IC 7404
- 1 - IC 74133
- 1 - IC 7421
- 1 - IC 7410
- 1 - IC 74373
- 8 - 150 Ohm Resistors
- 8 - LEDs (small ones)
- 1 - Prototype board (those with many holes) or a Breadboard that can accommodate all of the above components.
- And Lots of semi rigid wire.

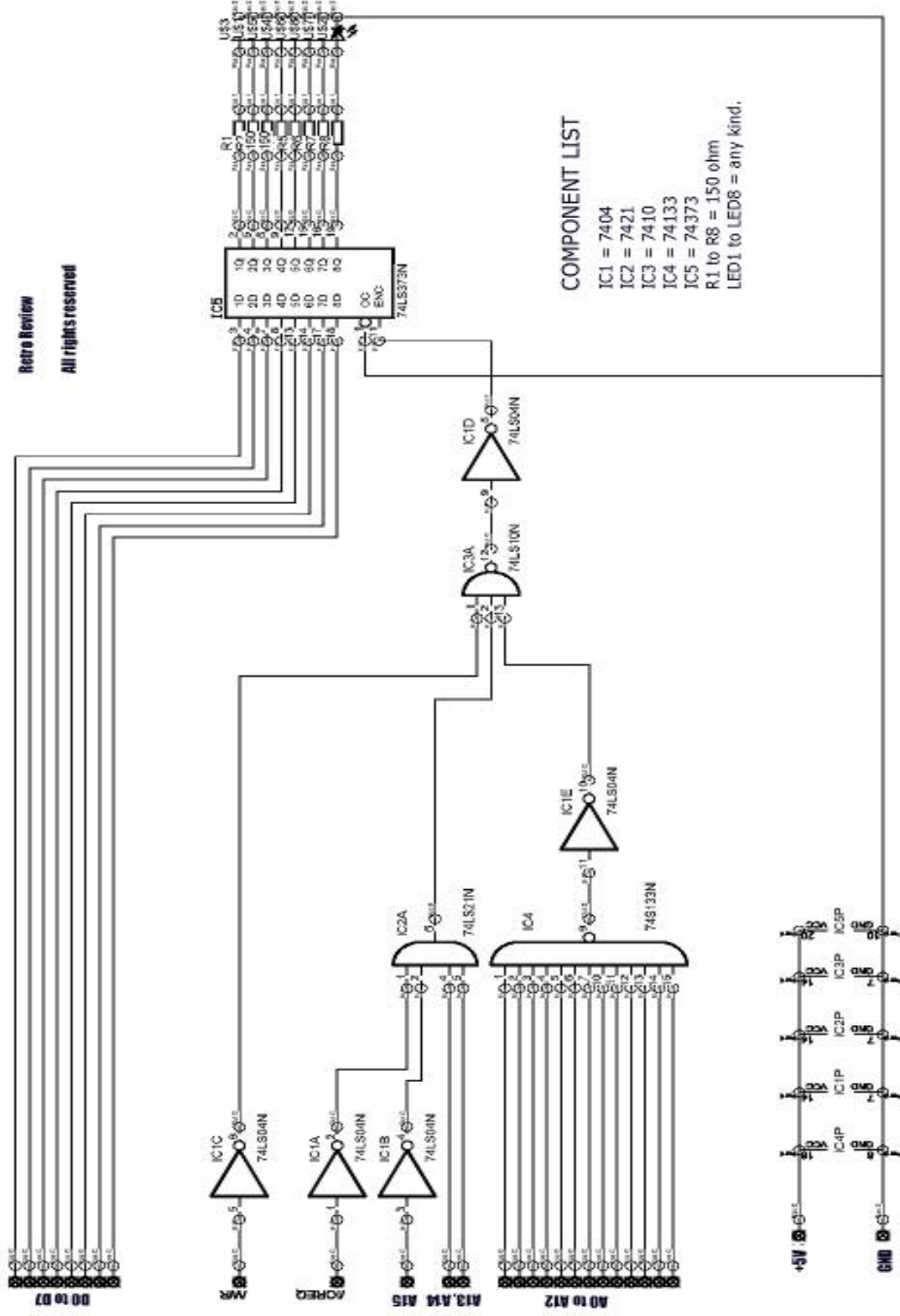
How does it work ?

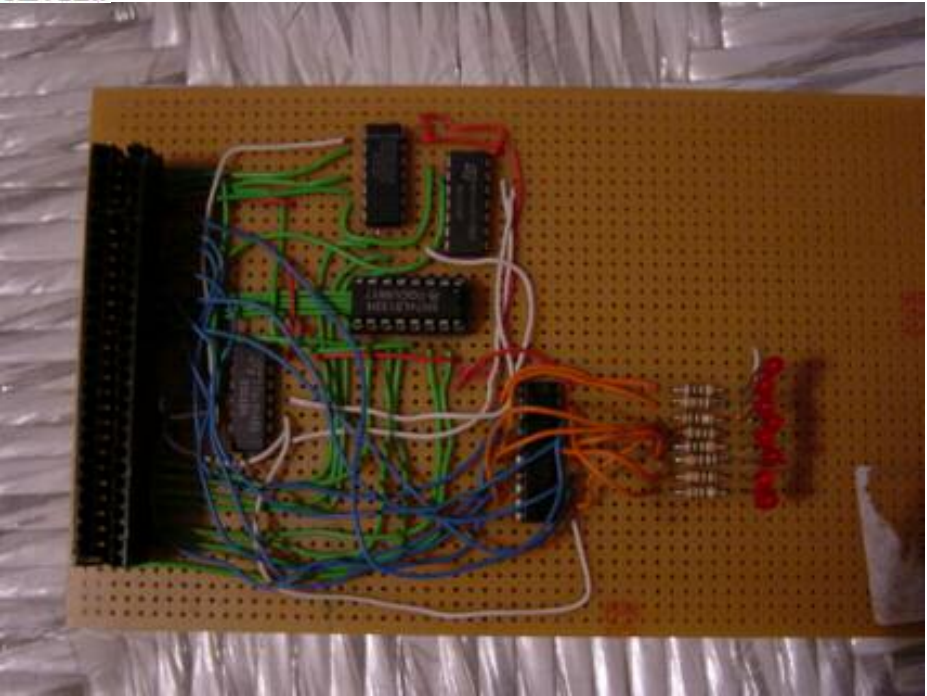
Quite simply, our project is composed of 3 parts: the address decoding part, composed of all chips except for the 74373, the holding part which is composed of the aforementioned 74373 and the display part which comprises the 8 leds. The principle behind it is simple: when something is *outed* to port 32767 the latch (74373) is activated and keeps a snapshot of whatever is on the data BUS. For the latch to be activated

via a OUT instruction, 3 things must happen at the same time. 1) The address being accessed must be 32767, the access must be I/O not memory and it must be a write access. Check the schematic on the next page, and notice how the logic chips combine to output a TRUE value if and only if the binary address is 0111111111111111 - which converted to decimal is 32767 (the last memory location of a 16KB Spectrum). Because explaining boolean arithmetics is beyond the scope of our mag we won't get into detail on how the AND,

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ABOVE : The Projects protoboard: I used green for address lines and blue for DATA lines (try to figure them out in B&W)! Try to keep the wires as short as possible.

NOT and other ports work; if you are out of sync in this subject there are plenty of places on the web to check out, or you can just take our word that it somehow works! There are 2 control lines which we use, the /WR and the /IOREQ lines. The first goes low whenever a write is being made and the second goes low whenever an Input/Output access is attempted. They both get *ANDed* with the address lines' result on IC3A (the 7410), right in the middle of the schematic on the previous page.

Building it:

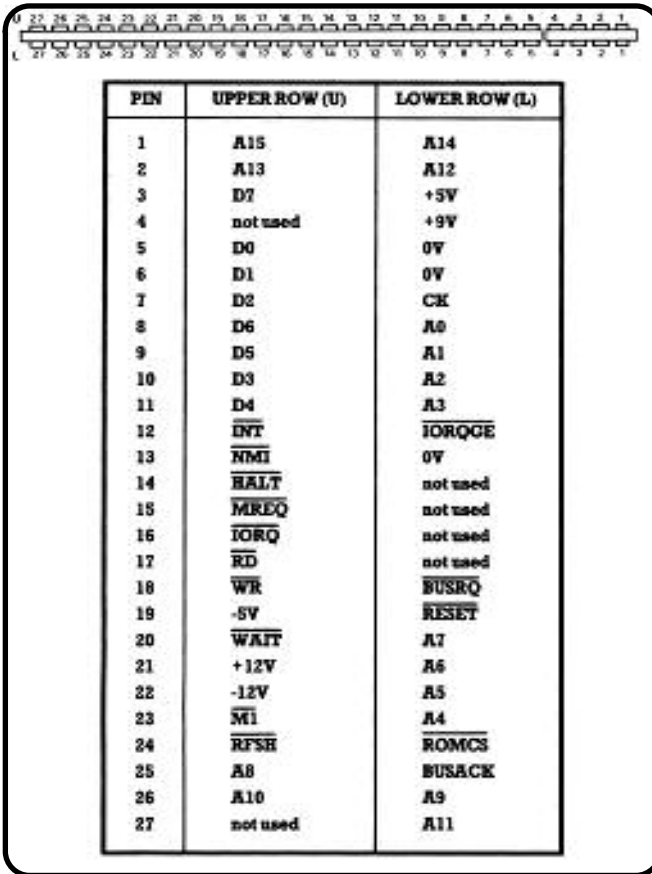
You should use a protoboard to make this project, it keeps the work tidier and more stable than a breadboard. The first thing you should solder is the edge connector- this should be done as precisely as possible as the easiest way to kill a Spectrum is by this

connector! Check each soldering to make sure NO pins are soldered together, then the IC sockets (if you use them - I found them as expensive as the chips themselves so I skipped them). Then it's just a question of weaving your cables from the connector to the chips and so on and so on. Use both sides of the board to make the tracks- in this prototype I used the bottom part almost solely for the ground connections so it would be more visible for you, From my personal experience, separate tracks by signal type - otherwise it is very easy to make a mistake. When you start the address lines do them all to the end and don't mix them with other ones.

Checking It:

This is the part that you have to be more careful than ever. Check and recheck EVERY connection! If possible use

On the left, the ZX Spectrum 48/128/+2 Edge connector.



PIN	UPPER ROW (U)	LOWER ROW (L)
1	A15	A14
2	A13	A12
3	D7	+5V
4	not used	+9V
5	D0	0V
6	D1	0V
7	D2	CK
8	D6	A0
9	D5	A1
10	D3	A2
11	D4	A3
12	<u>INT</u>	<u>IORQCE</u>
13	<u>NMI</u>	0V
14	<u>HALT</u>	not used
15	<u>MREQ</u>	not used
16	<u>IORQ</u>	not used
17	<u>RD</u>	not used
18	<u>WR</u>	<u>BUSRQ</u>
19	-5V	<u>RESET</u>
20	<u>WAIT</u>	A7
21	+12V	A6
22	-12V	A5
23	<u>M1</u>	A4
24	<u>RFSH</u>	<u>ROMCS</u>
25	A8	<u>BUSACK</u>
26	A10	A9
27	not used	A11

Getting the schematic online: go to our site www.retroreview.com, find the archive area and download it! We used EAGLE layout Editor, a really nice program for Linux and Windows. You can download the demo version from www.cadsoft.de - it is free for you to use up to a certain board size. The program also can draw the boards for your projects.

Keep it as handy as we will use it for other projects later!

some kind of continuity tester to make sure you have not shunted together things that should be apart.

Testing It:

Now for the most interesting part! With your Speccy turned off, remove all interfaces from your Spectrum and plug the protoboard onto the edge connector. Now turn on the machine - if it boots, great! If not, shut it down *immediately* and go back to the checking part again. Once it boots, type OUT 32767,255 . All the leds should go on! If not, it's back to the checking part again! If they all do light it's time to play with the board (by the way you can now plug your other interfaces back in). Try the 2 proggies on the next page - they do the same thing, but one was written in BASIC and the other in Assembler. Notice the speed increase on the second!

Other ideas:

You've seen how it works with OUT - if you want to POKE to light the leds, just change the wire that connects to /IORQ to /MREQ and thats it! A window to the 32767 location of your Speccy's memory.

So, now lets test it! In listing 1, you have a program that counts from 255 to 1 and outputs the value to port 32767 so the leds light in sequence. In listing 2 the same program in Assembly- use ZEUS to assemble it. Notice that it runs so fast that you can't actually see the led go on or off unless you break the program with something like a multiface!

```
10 FOR X=255 TO 1
20 OUT 32767,X
30 NEXT X
40 GOTO 10
```

```
ORG 40000
DUMP 40000
init LD A,255
start LD B,127
LD C,255
OUT (C),A
DEC A
JP NZ,start
JP init
```

See you next issue
Jorge Canelhas

It Works !!!!

DISCLAIMER aka The Small Print

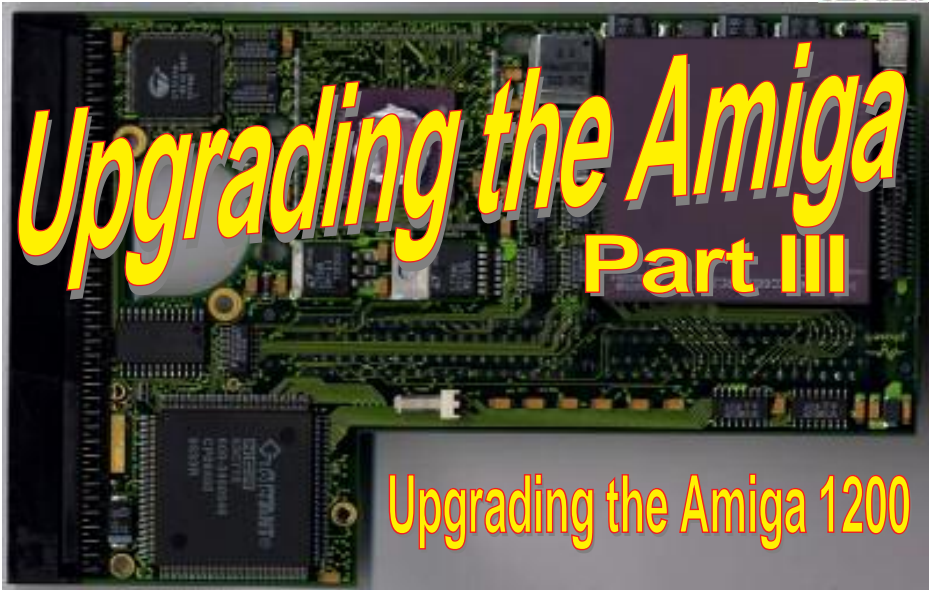
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Jorge Canelhas
Apartado 3115
Miguel Bombarda
2745 QUELUZ
PORTUGAL

The best project received every two issues will get a free issue as a prize.
ALL PROJECTS MUST PROVE TO WORK OR WILL NOT BE PUBLISHED.



Hi all, and welcome to another article of the Upgrading your Amiga series. In this article we will cover the upgrade of a Amiga 1200- without a doubt the most overexpanded Amiga of all. Forget pretty connections, when upgrading this dude, every piece of metal on a chip is a potential upgrade connection...

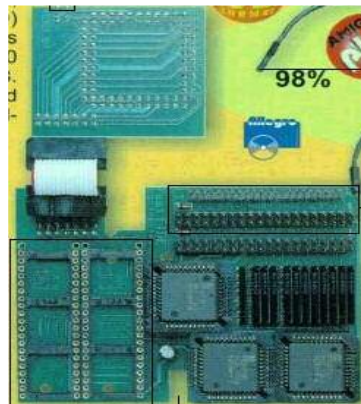
The system:

The barebones amiga 1200 features a barely impressive 68020 CPU running at a slow 14MHz, 2MB of chip Ram, AGA chipset (sloooowww) and maybe a small hard disk. What can you use out of your original system ? Most probably just the board and box with keyboard.

Hard Disk:

No hard disk ?!?!? Get one NOW! Leave now and go buy one- don't even finish reading the article. There are plenty of choices for hard disks, you can find 2.5" disks really cheap. Get at least a 2GB disk capacity and if you are not going to upgrade the Internal IDE interface don't bother to get one larger than 4GB: it's not supported by the internal Amiga Interface. On the other hand you can get yourself a better IDE interface like

the Power Flyer Fast ATA1200 in the picture below. This will allow you to connect up to 4 IDE devices and have long cables on your IDE (remember the 1200 interface is unbuffered, meaning that long cables with fast data transfer means loss of data). This interface will allow you to have bigger disks too.



Notice the expansion method: take the ROM chips out, position the board, clip the small board on the top of other chip and you are rolling! Not pretty eh? There are also simple and cheap buffered adaptors for the internal connector- if you are feeling lucky you can get a 2.5" to 3.5" IDE cable and hookup a 3.5" drive and CD ROM to the 1200s internal connector, Here though you are on your own - don't say we didn't warn you.

The definitive and most trustworthy hard disk solution for the 1200 is to get a SCSI interface that connect to an accelerator card. This way you have SCSI speed, lots of connections for both disks and other SCSI peripherals and most important of all reliability. There are plenty of accelerators that support SCSI: the best known is the Blizzard Series wich is very reliable.

Memory Upgrade:

2MB is really a small amount of memory and because it's chip ram (accessed by all of the chipset) it is very slow. Just by adding FAST ram (memory that is accessed only by the CPU) your 1200 will almost double its speed. Though there are several ways of upgrading memory the really sensible solution is RAM through an accelerator board. You should know that there are ram expansions that plug on the CPU slot and also PCMCIA ones: forget the latter, it's slow and can give problems with accelerator cards.

CPU Upgrade (Accelerator board)

As I mentioned, a 68020 is good for almost nothing, and once again there are plenty of choices in accelerators. The 030 at 50MHz although slow can be



a first step in acceleration for your Amiga, providing you with the faster CPU and memory expansion. Besides if you go for some brands like the Blizzard you can expand further by adding a SCSI interface wich is much faster than the famous Squirrel or similar PCMCIA interfaces. If you have enough money you can go for a better processor: I'd recommend a 060 as 040s are not that much cheaper and you'll get a much better processor. Plus, a 060 can be easily used on a desktop 1200 whereas the 040 needs a good cooling system that can't be easily achieved on a standard case Amiga 1200. As you have



the Amiga 1200 wasn't made to be very far expanded. Nevertheless there are several ways of doing so. First forget 15KHz video if you want to do something serious besides video titling. PAL, Hi-Res etc. etc. are worthless: the only real way you can use it is if you get a scandoubler/Flicker fixer. These are available from a lot of places like Power Computing (www.powerc.com) or Merlancia (www.merlancia.com) just to state a few. There are two kinds of SD/FF: internal and external. The internal requires you to open your Amiga (don't worry about warranty as

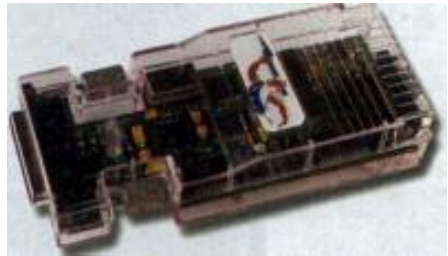


probably noticed by now, the accelerator board is probably the most important expansion for your Amiga 1200. This is especially true as there is only one CPU slot in the 1200 so use it wisely.

Graphics Upgrade:

As I said in previous articles, video is also one of the most important things in a desktop computer like the Amiga: it's the way the computer communicates with you, so don't overlook it. Expanding the graphics capacity of an Amiga 1200 isn't a walk in the park, mostly because

Commodore went bankrupt a long time ago) and plug the SD/FF on two chips-then find a way to get the VGA socket outside without damaging the flat cable. Note that although tidy it will be difficult for you to use an internal 3.5" HDD with this solution as you will be out of space and must leave your beloved 1200 semi-opened. The external version is much more practical: it's just a matter of plugging into the RGB port, just like the A520 (TV modulator) worked on the Amiga 500. Besides this you can use it on an Amiga 3000 or 4000 later as there are no chip specific connections. Please remember that you won't be able to use special modes like some productivity ones or Super Hi-Res as it falls out of range of the resolution that the SD/FF can provide, but then you can't have it all can you?



What's a Flicker Fixer / Scan Doubler ???

First bear in mind that any refresh rate below 60Hz becomes annoying after a while.

Flicker Fixer:

The Amiga when in interlace mode uses a neat trick to overcome speed and resolution problems and achieve a hi vertical resolution. Instead of drawing the screen from line 1 to 512 step by step, it first draws the odd lines then the even ones, thus producing that flickering that can tear your eyes into pieces. A flicker fixer corrects this by buffering the frame and thus making the lines stay on screen so you can't see the discrepancy in lines being drawn every other sweep. Now remember that when in PAL mode you have a 50Hz refresh rate (becomes annoying after some time just by itself) then halve the refresh rate and see what you get. Remember a television has a higher persistence than VGA monitors so you will notice flickering easier in the latter.

Scan Doubler:

As you should know the scan rate of standard Amiga modes is 15KHz. Standard VGA monitors sync at around 31KHz, so as you can imagine, it's no good to use a VGA monitor (unless it has multisync) for standard Amiga modes. Of course you can use multisync or productivity, but as well as being slow that doesn't allow as many colors as PAL or NTSC. The scandoubler sorts this problem by doubling the scan rate from 15KHz to 30KHz allowing VGA monitors to be used.

Usually ScanDoublers come with flicker-fixers so you get both for little more than the price of one.

Graphics cards:

There isn't much of a choice when it comes to graphics cards for a Amiga 1200. There is the BVision card (see pic on previous page) that attaches to the Blizzard PPC and that's as much as you get without further bus expansion (see next page).

Network Expansion:

Again there is not much choice when it comes to expansion. Either you get a bus expansion or you stick to dialup, serial, parallel or a PCMCIA network card. Using the PCMCIA isn't difficult providing that you get a fully NE2000 compliant card that works with cnet.device (get it from aminet) and that you are lucky enough not to have PCMCIA reset problems. When I used a PCMCIA network card I sorted the RESET problem by removing and re-inserting the PCMCIA card and restarting MIAMI, but try this with a towered Amiga 1200! You have the choice of getting a reset fix like the one supplied with the Power LAN PCMCIA card from Power Computing, but you wont be able to use the internal flicker fixer as it attaches to the same chip !!!



Serial Port Upgrading:

The serial port of your Amiga 1200 is slow and can't cope with the speed of most modern modems, so time to upgrade again! There are 2 ways of doing so, by a Clock Port Expansion like the IOBLIX or by PCMCIA like the Whippet. The first kind has loads of boards to choose from, and it connects



to the clock Port (that little socket near the ROM chips). As a drawback it will fill even more of your 1200- if you have a Power Flyer it will be a pain to connect. The second kind (the PCMCIA port) has the inconvenience that you only have one PCMCIA port and that is probably already used by a network or SCSI card (now you see why I told you the 1200 was a pain to expand). When you think about serial expansion options in your 1200 you often find that you can cope with the speed of the internal one and so use one of the several device drivers on Aminet to optimise your serial port.

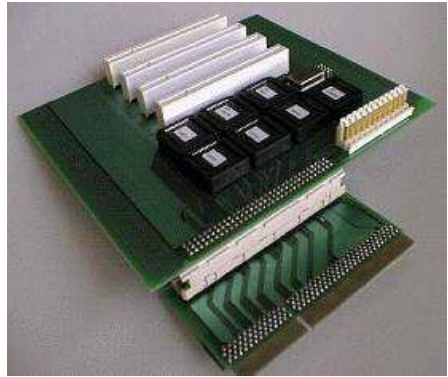
Going further:

Ok, i may seem a little biased here, I really don't think Amiga 1200s are to be expanded to the point many are, but one thing is for sure there are plenty so called over-expanded machines that work very well indeed. To get that level of expansion, you will need 2 things: a tower to put your 1200 in and a bus expander (either to Zorro slots or even better and at probably the same price to PCI). Having Zorro or PCI will allow you to choose from a great number of graphics, network, sound etc etc cards. I won't tell you which to choose as both have virtues and defects, but costwise, the PCI solution is more appealing. PC cards are as cheap as they can be and for a small fraction of the cost of an Amiga Graphics card with a more than obsolete chipset you can get a graphics card, a sound card and a network card in their PCI form.

As for which solution to choose, I'm really inclined toward the Mediator or the G-REX (providing you have a Blizzard PPC card). Every day there are more and more PCI supported cards,so PCI is a good bet both in cost and in future expansion. If you want compatibility than go for a Zorro expander that will add Zorro slots for your 1200. As far as i know there are no Zorro 3 expansions, so you have to cope with Zorro2 speed, but keep in mind that both the PCI and Zorro expansions require a towered Amiga 1200.

In the End...

Ok, you overexpanded your Amiga 1200 and you turn it on, and it doesnt work. Why? Probably you need a more powerful power supply. Usually tower cases provide power supplies, but if you are the compact lover guy and expanded your overcrowded desktop



case your low power A1200 power supply most probably won't suffice. Try getting an old Amiga 500 power supply (the heavy kind) these are much better than the new cheapo Amiga 1200 Power supplies, or a Goliath or similar heavy duty PSU.

In conclusion:

It is my opinion that if you want to really expand an Amiga computer you should go for a big box Amiga like the 3000 or 4000. These were made to be expanded, and with the money you spent on trinkets for your 1200 you will be better off starting with a 2nd hand 3000 or 4000 that will probably be already somewhat expanded. Another point is that all those wires and socket connections won't make your Amiga that stable at least electrically and if a trinket jumps of place with your Amiga turned on you can probably kiss it goodbye. Either way enjoy your Amiga and I'll see you next issue.

Jorge Canelhas

Are the Microdrive and other drive systems the best answer to fast and reliable data access on the ZX Spectrum Range of computers ? Well Joao Paulo thinks not, and he will tell you why ...

Timex FDD 3000

Driving the Portuguese way...

When I took my first look at a picture of Timex FDD system, I asked myself: What are the 3 boxes? What do they do? Where is the disk drive?

Now that I know what the Timex FDD really is, I understand that it is more than a disk interface...



When you look for the first time to the Timex FDD you think "what a strange disk interface". But the Timex FDD is more than a disk interface...

The original Timex FDD.

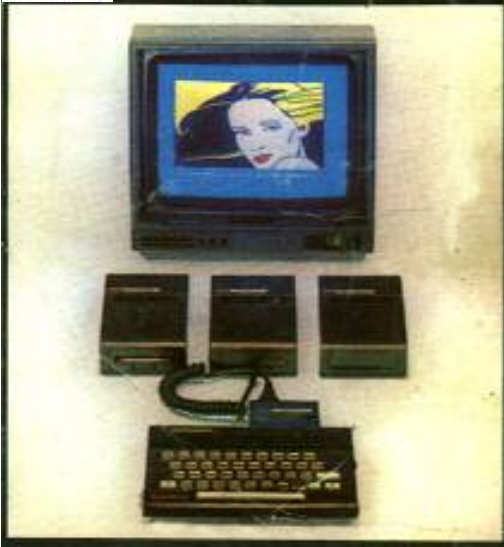
When Timex of Portugal (TMX) made the Timex FDD, they built it to be an upgradable machine, so they divided the components into 4 boxes for a fast upgrade.

The interface

The interface is called the Timex

Interface (TI for short). TI plugs directly into the back of the Timex Computer (TC for short) and it doesn't provide any pass-through to connect other peripherals; in the opposite side is the plug to connect the FDD cable. TI have a reset button to reset only the TC. Inside TI we have an EPROM, some GALs and some RAM. Because of the way that TI works and the different ROM code in TC2048 and TC2068, TMX made two version of TI. The TI for TC2048 have a black reset button and the version for TC2068 have a silver reset button.

Some third party companies produce



some variants of TI: Zebra Systems sold a TI with the two versions in one box with a switch to change TI "mode"; Stavi (a Polish company) made a version of TI for ZX Spectrum 128K, by changing some of the code in the TI EPROM. It is possible to connect the interface in a 128K +3 by hacking the code in TI EPROM and fixing the incompatible +3 expansion port. In all the TI I have opened, I always found EPROMs.

Jarek in Poland made a replacement for TI, more advanced than original TI.

The Power Supply

The power supply is of little interest:

it is a power supply with 3 power connectors for the controller and two disk drives, it has a power switch in the back to switch on and off the entire FDD system and a led in the front to show if the power supply is on.

The Controller

This is the most spectacular part of the FDD system.

The controller is in reality almost a complete computer. It has its own processor (Z80A@4Mhz), its own ROM (2K), its own RAM (16K), two serial ports (RS232C) and the disk drive controller. The only thing it is missing is a graphic circuit. A reset button is placed in the front of the unit to reboot the Operating System, a led is used to show if the unit is receiving power and then there's the cable that connects to the TI. The ribbon cable gets out of the controller box in the back. It is soldered to the board, so if you want to replace the ribbon cable, you must remove it and solder a new one. The ribbon cable provides two connectors for two disk drives. The connectors are like the connectors for 5,25 disk drives in the PC. 4 drives can be connected to the same controller, each one with 140K giving a total of 560K of disk space in a 48K computer! You can connect any kind of RS232C peripherals: printers, modems, computers, ... It is possible to connect two FDD systems by using the RS232C ports and exchange programs and data between them.

A RAM upgrade option was available, replacing the 16K RAM module, by a 64K RAM module.

The disk drives

The disk drive is a 3" unit made by Hitachi, it has 1 head and 40 tracks. This disk drive doesn't have the problem with rubber bands that the ZX Spectrum 128K Plus 3 disk drive have, since it works the same way that modern 3,5" disk drives work. 3" disks are "turnable", if you want to use the other side of the disk, simply remove it

from the drive, turn it over and insert it again.

The Operating System

Now that we know that Timex FDD is a computer, it requires a OS to work and it must be loaded from disk. The Timex FDD can boot any OS made for it (the controller ROM reads first sector of track 0), but TMX made a OS that really fits well in Timex FDD, the TOS - Timex Operating System. The first version of TOS, TOS A.1, is not very common since TMX replaced it by TOS A.2 very quickly. TOS A.2 is a very powerful OS and is the most popular OS for FDD.

TOS A.2

TOS is very easy to use. Every time a TOS command is issued it passes straight to the controller, which then executes the instruction, placing no overhead on the TC, and of course is not dependent on any hardware limitations of the TC, such as available memory.

The way of accessing the TOS commands is familiar to those used to the SPECTRUM BASIC's use of keywords. All the TOS commands use existing keywords, but they are followed by an *(asterisk), so that LOAD becomes LOAD *.

The beauty of TOS is that it does not interfere with the existing instructions relative to the cassette, so that you are still free to use your cassette and disk drives at the same time, and even from within the same program. You need not change your existing programmes when using TOS, but you will need to use LOAD * and SAVE * to transfer the programs to and from the disks (in much the same way you would for a cassette). The syntax is essentially the same apart



from the "*", which is there to activate TOS.

Instructions can either be executed directly from the keyboard or from within the program like any other BASIC instruction. TOS therefore becomes an extension of the SPECTRUM BASIC, with all the disk and file handling facilities of TOS acting as extended BASIC functions.

TOS works with overlays. The code takes 16kB, but only first 10kB are in RAM all the time. Then, at #2800 one of 3 overlays is placed and takes 2kB. The last 4kB is reserved for data. The overlays are loaded from disk, when they are needed. Also the overlays can freely call main code, but the main code calls code in overlay via a little table at the start of the overlay.

This is why, when a command is executed, it takes a bit of time to start. TOS formats disks with 40 tracks, 8 sector per track and 512 bytes per sector, so a disk has 160K/side, but TOS takes 16K for itself (so TOS is able to boot from any disk), the file table

(FAT) uses 4K, which leaves 140K free for data. The minimal allocation space is 1K (a file with 100 bytes will use 1K of disk space).

The FAT can hold 128 entries, the disk name uses one entry, other directories also use one entry and files occupy one entry per each 16K in size. Therefore, a file with 7K uses one entry and a file with 50K uses 4 entries.

TOS uses a tree structure like MS-DOS. A directory can exist inside of another directory. This is useful to avoid mixing up many programs. The separator used in pathnames is ":". Only 15 directories can be created in each side of the disk, but the structure of the directory tree does not matter.

CAT ":" will catalog the root of the system, not the root of a disk. This suggests that TOS treats disks as a part of the tree (the root represents the physical resources of the system). In the root, TOS lists disk names and the two RS232C ports (TOS treats RS232C ports as files).

To open files, TOS has its own 16 channels, so it does not use any resource from the TC. Those channels can be used with the serial ports too.

And now the FDD3000

The FDD3000 is a upgraded Timex FDD. It has the same power supply, the same controller but with 64K RAM, two 3" disk drives and a new box with everything inside! This is what makes the FDD3000 look good. To make the same system with the first version you'd have to have 4 boxes!! Plus, you can put the monitor (or TV) on top of the FDD3000 box!

The FDD3000 was made to use advanced Operating Systems like CP/M.

Summary of TOS commands:

ATTR * - Change file Attributes
CAT * - Catalogs a disk/directory
CLOSE #* - Close a file
DIM * - Creates an empty file or a directory
DRAW * - Return to the last directory in the special stack. Used with GO SUB *
ERASE * - Erase a file
FORMAT * - Formats a disk or configures the serial ports
GO SUB * - Change directory/drive with a special stack. Used with DRAW *
GOTO * - Change directory/drive
INPUT * - Reads data from a file or a serial port
LET * - Rename a file or directory
LIST * - Lists information about the current directory
LIST #* - Lists information about a channel
LOAD * - Loads a file or data from serial ports
MERGE * - Merge a Basic program
MOVE * - Copies a file
OPEN #* - Open a file or a serial port
PRINT * - Send data to a file or serial port
SAVE * - Save a file or send data to a serial port

There is a undocumented command:

NEXT * - Works like PATH in MS-DOS, but for only one path.

TOS BOOT PIC

TOS does not use the extra RAM in the controller, though the FDD3000 TI is the same TI as the FDD, so the TI can be used with any FDD system.

The first series of FDD3000 used a controller from the FDD. Later models have other revisions of the controller.



A View from the back of the Fdd3000 on page 31 you can see a pic of a complete fdd3000 and TT3000 system

CP/M

Timex adapted CP/M to work on FDD3000 in their Portugal division.

CP/M was referenced as an advanced OS and it has two ways of being used with the FDD3000: Using a TC as a console or using the Timex Terminal 3000 (TT3000), a keyboard containing the graphical circuit that the FDD3000 don't have.

To use CP/M with FDD3000 and a TC to be used as a terminal to display information from CP/M (using a TV or composite monitor), TMX made a Terminal Emulator program which came in the CP/M disk. Side A has the Terminal Emulator and side B has CP/M. With the system turned on the terminal emulator disk must be placed in drive A and the reset button must be pressed. The terminal emulator is started automatically and when it finishes loading, a message appears to the user turn the disk over and to press the FDD3000 reset button to load CP/M. With the Terminal Emulator, CP/M is shown in a 64 columns display. Since CP/M requires more keys than the TC keyboard provides, some combinations with symbol shift and caps shift simulate the missing keys.

TT3000

TT3000 stands for Timex Terminal 3000, a CP/M keyboard to be used with CP/M and FDD3000. To use it simply connect the FDD3000 cable to the TT3000 (the TI is not necessary), connect a composite monitor to the back of FDD3000, turn on the monitor and FDD3000, insert the CP/M disk (the Terminal Emulator is not necessary)



and the system is ready to be used.

TT3000 design follows the design of Timex Computers series 2000: it is the same size as a TC2068 and it is black. Inside TT3000 is the graphic circuit (TC2068 SLCD and video RAM) that FDD/FDD3000 is missing and a ROM with optimized Terminal Emulator code. Because of this, CP/M is shown in a 80 column display.

Clones

Some companies have produced “clones” of FDD and FDD3000. In USA, Zebra Systems have imported FDD and FDD3000: they painted the FDD boxes in silver, renamed the Timex Floppy Disk Drive to Zebra Floppy Disk Drive and erased all the references of TMX from the manual. In FDD3000, Zebra used white paint over the “Timex” word and glued over the paint, a sticker with the word “Zebra”. Since the TI is Spectrum bus compatible, Zebra made a board called the twister to allow the use of FDD/FDD3000 in TS2068 and later the super twister to allow the connection of more peripherals to be used in conjunction with the FDD/FDD3000.

In Spain, Investronica (the mother of Spectrum 128K) tried to sell the FDD as InvesDisk, but it seems that it wasn't very popular, since very little information about them can be found on the internet.

Before TMX closed the computer lines, they exported many TC2048s, TC2068s and FDD/FDD3000 systems to Poland. A Polish company, UniPolbrit, took some of the FDD and made some changes too. First, it put the controller and the drive in one box (I'm not sure about the Power Supply) and renamed it to Unipolbrit FDD. Unipolbrit also took TC2068 and made some modifications too and made the Unipolbrit Komputer 2086, but this is another story.

There are some rumors that in Poland, a company has made a FDD6000, a FDD3000 with two 5,25" disk drives and a new box to hold the two drives.

Upgrading your FDD/FDD3000

Controller

The FDD controller RAM can be upgraded to 64K. This is only useful if you use CP/M or if you are designing a new Operating System that uses more than 16K RAM.

Disk Drives

If you have a 5,25" DSDD disk drive (40 tracks, 360K) in a dead PC, you can use it in the FDD/FDD3000. Simply configure the drive to be the second drive (examine the drive very carefully, a jumper must exist with 4 possible connections: 0, 1, 2 and 3), connect the ribbon cable (remember that the red wire must be in the side of the power plug) and the power plug in the drive. Turn on the system, insert a disk and try to format it. If there is no error, then the drive is working. Since the 5,25 disks weren't made to turn over to use the other side, you can use only one disk side. The Polish FDD users have put a switch in the drive (this changes the signal select) to select which side the drive will read/write!

If you have a 3,5" DSDD drive (80 Tracks, 720K), you can use it too. Like the 5,25" drive, it must be configured to be a second drive. To connect the 3.5" drive, a adapter must be used, or replace the connector from the ribbon cable with one for 3.5" drives. A adapter is also required for power, since the plug in 3.5" drives are not the same size as the plugs for 5,25" drives or again, remove the old plug, to a new one for 3.5" drives.

With this drive there is no need to install the switch like the 5,25" drive, since TOS have undocumented support for them.

With an 80 track, double sided drive, TOS formats disks with 640K. 16K are used for TOS, 4K for the file table and 620K for the user. TOS formats first side 0 (tracks 0 to 79) and then side 1 (tracks 80 to 159).

To format a 640K disk in drive B, type:

```
FORMAT * B TO disk640,d
```

The d letter tells TOS to format a disk with 80 tracks. This must be done because TOS does not know if the drive is 40 tracks or 80 tracks. If you try to format a disk in a 40 track drive, the heads will hammer against the plastic disk box and may damage the drive and if you format a disk in a 80 tracks drive without the d parameter, TOS will format a 140K disk. With 4 80 tracks drives we can have 2.4MB of disk space.

I haven't heard if anyone has ever used a 5.25" DSHD drive (80 tracks, 1.2MB) or 3.5" DSHD drives (80 tracks, 1.44MB).

For more information about the Timex Computers, Timex peripherals, TOS and CP/M, please visit www.msts.pt.vu

João Encarnado

Interview of The Month

The Sprinter Team Speaks with us.

Hello all! Last issue we printed a review on the Sprinter computer that caught the interest of many people. Lots of questions were asked and plenty of them we just could not answer, so Jorge Canelhas thought it would be interesting to make an interview with the Sprinter team- in this case represented by Alex Goryachev, the Project manager, who we must thank for his time and patience in answering our questions.

1) Who makes up the whole sprinter team ? What are their roles?

The Sprinter Team is a division of Peters Plus Ltd (St.Petersburg, Russia). The Sprinter Team was founded in January of 2001. Before, in 1998-2000, the Sprinter Project was not active. The main reason for the creation of the Sprinter Team was the continuation and development of the Sprinter computer as well as faster progress of the Sprinter Project.

The Sprinter Team includes: Ivan Mak (Senior Hardware Engineer), the man behind most of the ideas in the Sprinter architecture, Denis Parinov (Senior Software Engineer) author of OS Estex and Alex Goryachev (Sprinter Project Manager). Accordingly, our functions are different and we work in three ways: development of architecture and hardware issues; software support of Sprinter hardware and creation of basic users software; general direction and public relations.

2) Why make the sprinter compatible with the ZX Spectrum and not a



Ivan Mak (Senior Hardware Engineer at Peters)

computer of its own without 'emulation' ?

The Sprinter was born from the ZX Spectrum. The Sprinter Project was started in 1996- the ZX Spectrum computer was still very popular in Russia at that time. Then, Russian Spectrum clones like "ZS Scorpion 256Turbo" and "Profi-512" were powerful but with old Spectrum problems too: weak graphic features and non-standard peripherals. The first idea behind the Sprinter Project was the creation of a new Spectrum clone with 16 colors for in

8x8 pixels, which can use modern peripherals: hard disk, keyboard, mouse, 3.5" floppy disk drive. We used a new architecture solution with the Altera PLD as the kernel of the architecture and a Zilog Z84C15 as CPU. We hoped that new features would be supported by programmers. A Sprinter prototype was shown at the Enlight party in St.Petersburg in August, 1996, but the new text and graphic modes had not made a big impression. In the party members' opinion, that computer did not much differ from original ZX Spectrum and users couldn't use it without software. So, we decided to use Spectrum mode as the main mode until the creation of software which would use the new features. We created a new Spectrum main menu for support of changing of architecture modes, and upped the clock speed of the CPU to 21MHz. We then made the hard disk accessible from Spectrum mode and wrote support for standard TRD files (TR-DOS disk images), which can be used as Sprinter RAM-disks. We also made different Spectrum configurations, which include several of the most popular (in Russia) Spectrum clones. However, we also created another configuration, with new features. Work on the OS Estex (Sprinter DOS at that time) was started in 1997, and several programs to use the new features were made. So, when the Sprinter computer with the new Sp97 Mainboard was shown at the FUNTOP party in Moscow, in 1998, it was the Spectrum compatible computer with the most comfortable and most rapid work possibilities. It could use any Spectrum software, yet had additional features like new graphics and text screen modes, supporting IDE devices and some other modern peripherals. Plus, all features had software support. MS-DOS FAT16 and several of the more important file standards (txt, bmp, wav)

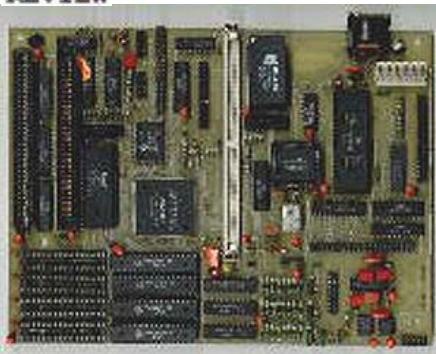


Above: Clones from Peters Plus, respectively above, a ZX Spectrum and in the bottom the Peters MC-64 (picture copyright Steffan Vilcans)

were supported. Only in 2000, when the Sprinter Project was continued, was the Sprinter configuration with its extra features made as the main configuration and Spectrum configuration was made an emulation mode. Now we're considering emulation of some other 8-bit computers.

3) What did Petersplus do before the sprinter ?

PETERS PLUS LTD was founded on April 29, 1993. Peters Plus started as assembler of Russian Spectrum clone with the "Leningrad 48" scheme. This clone had the name "Sinclair ZX Spectrum". But next we created some modifications to this scheme and put a power supply unit into the new larger case with 58 keys. That was the first model of Spectrum clone by Peters Plus. It had the name "Peters MC-64". It was same ZX Spectrum 48K, but the



Sprinter 97

use of "64" (64K memory allocation) in its name sounded more interesting to customers. Some of these computers had Secam video decoder and/or a "Service Monitor". Additional ROM contained the "Service Monitor" - several programs which could quick load from the ROM to the RAM. The first version of the "Service Monitor" included an assembler&monitor and tape copier program. Second, the "Service Monitor" included a text editor, Tetris and tape copier program. Computers with "Service Monitor" were comfortable and popular. Several thousands of "Peters MC-64" computers were sold in two years. In the same year, we tried to make a controller for an external 5.25" FDD, but this drive controller didn't sell well. More popular was the "Peters MD-128" in a special desktop case with a 5.25" FDD and external keyboard. It followed the "Pentagon" scheme and had 128K RAM. Some of these computers had a "Service Monitor" too.

At the end of 1994, we began to make the "Peters MD-256" using the "ElyCo" scheme with 256K RAM. In 1995, a solution for secondary schools was developed in cooperation with "Iskra-Soft". It included a local network of ten "Peters MD-256" connected to the teacher's "Peters MD-256" which had a HDD. Software support was made by "Iskra-Soft". In the next year, 1996,

cooperation with "Iskra-Soft" was continued, and a third version of the "Service Monitor" was made. It contained an alternate (to TR-DOS) disk operating system - IS-DOS by "Iskra-Soft". This OS was well known and popular in Russia in 1994-1998. In the same year Peters Plus began to create the Sprinter computer.

4) How long did you take to develop the Computer Sprinter ?

As I said, above, the Sprinter Project was started in 1996. The 1998 year was not lucky for Sprinter computer, and Economic crisis in Russia was a killer of our well progressed project. It's a pity, because we lost time and a lot of people who were involved in our project. Only in 2001 did Peters Plus find the opportunity to continue this work. Repair of the project took a half year and now we are progressing well.

5) How many people were involved on the project ?

Today about twenty people take part in the Sprinter Project. Most of them create software for the Sprinter, but it's too early to talk about these projects. They have each started in a different time but we hope to see results in the Autumn. I can talk only about Anton Enin, author of "Flex Navigator" commander - he is taking part in two software projects now.

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So there you have it: the end of the interview. Just enough time to thank Alex and all Sprinter Dudes for their time and courtesy to us.

If you have any more questions why not contact the Sprinter Team directly? Check their site at www.petersplus.com - you won't regret it as they are really nice people, and NO im not getting paid by them!

C h a o s - t h e B a t t l e

Some games are fated to be played over and over again - and *Chaos* is definitely one of them. *Ian Gledhill* fires up his most often used Wafadrive cartridge on his Speccy for a bit of good old-fashioned Wizard-bashing...

Back in the mists of time a company called Games Workshop were busy creating role-playing games, as they are today... but in 1984 they were also commissioning 8-bit computer games! Not full AD&D games - remember in '84 the computers would have struggled rather - but more games along the same lines. One such game was *Chaos*, written by someone called Julian Gollop. It was a fairly unassuming game - the graphics were nothing really special, the sound functional, and the gameplay simple. But effective. *Very* effective. And it's the simple gameplay that keeps it played even today - ask the comp.sys.sinclair newsgroup what their favourite game is and *Chaos* will be mentioned without doubt.

It's a simple situation that the game describes: one arena of some fifteen squares by ten, and anywhere between two and eight wizards. At least that's how it starts out - it rarely stays like that. Anyone who knows Gollop's follow-up, *Lords of Chaos* won't be surprised to learn that most of the combat is done not by the wizards but by creatures summoned from their own planes. However, there's no mana in this game - everything is done by chance. The chance of casting a Giant Bat in the first round is pretty high, some 90%, but trying to cast a Golden Dragon in the first go is at best hopeful and worst just foolish! Of course if you pull it off you have a very tough creature with which to waste the opposition.... but with

only a 10% chance of success, you're better off waiting...

As more and more spells are cast, the allegiance of the whole arena



Let Battle Commence!

changes... cast a lawful spell successfully and the arena becomes that little bit more lawful. Cast a chaotic spell and the reverse happens. Naturally, the more chaotic the arena, the more likely a chaos-aligned spell is to succeed - 10% more likely, in fact, per point (each round the allegiance of the arena changes by up to two points in either direction). So cast enough chaos spells and watch the probability of that Red Dragon you've had your eye on grow. Of course that makes it all the harder to cast that lovely giant you were going to use to flatten the gorilla just cast up by the wizard next to you, as although it's never less likely than it is in a neutral arena, you can't increase the chance without getting rid of those chaos points first (think of chaos as

being less than zero, law as more than zero, and the rating somewhere between -10 and +10).

It's not just creatures you can summon, luckily. Fire and Blob both help or hinder you - fire envelops everything but doesn't block line of sight, where as blob will stop anything, but can be destroyed. Each go the blob or fire will spread that little bit further until there's a screen full of it, quite often. At least you can easily hide behind a wall - that's a nice easy spell, the Wall spell.

Even among the creatures there



My Wizard's Vital statistics - less than impressive (except that Magic Resistance!)

are different types - not just different alignments, but also different abilities or states. For instance, a Pegasus can fly - very useful for sniping from a distance if the enemy can't fly back. Your wizard can also hitch a lift on it, or perhaps he'd prefer a nice unicorn - they can't fly but they're great in defence and that horn is rather sharp, so it's great for cleaning up stragglers. Many creatures are undead - such as the zombie (a puny 1/1 (1 combat, 1 defence) troop who's a great mobile wall as only other undead creatures and magic weapons can hurt it. The cream of the undead crop, of course, is the vampire - flying, undead and with a vicious bite you can really on him to cause a bit of trouble in the

enemy lines. Best of all though is a little spell called, imaginatively, *Raise Dead*. As each living (i.e. non-undead) creature dies, there's a good chance it'll leave behind a nice corpse, fresh for a bit of resurrection. Not always, of course - have you seen the mess a giant leaves when it squishes an orc? Find a handy pegasus body, though, and you're laughing.. you can still ride on undead mounts, so essentially only magic and undeads can hurt your wizard, who can in turn fly away by 5 squares if he wants. Very handy. Alternatively, for maximum destructive power, wait for a Golden Dragon to snuff it (it does happen - occasionally!), ride in with your wizard and give it a fresh breath of life. Blam! Instant 9/9 fire-breathing flying undead wizard-eater. Best make sure it's not an illusion first, though... don't want to raise an illusion.

Every creature can be cast as an illusion - which is great as they always arrive (not surprising as you're just pretending to summon one). Unfortunately each wizard has the ability to use his spell phase to try and disbelieve any creature on the board. So if you cast a Golden Dragon on your first go, you can rest assured someone else will try and disbelieve it pretty quick.

So what is it about this game that makes it so good? Hard to say really - probably the vast amount of variety each game holds. You'll never have two games the same (except the time when the wizard below you uses a Magic Bolt on the first round - but then you should always cast a creature in the way to block that anyway!), especially when you have a few mates round. Preferably seven of them. Whether they'll still be talking to each other afterwards is perhaps a small worry - launching a full scale vampire army on your best friend is sure to jeopardise the strongest

friendships. Also that feeling of casting a *really unlikely* creature and watching your opponents try and fail to disbelieve it is great - almost as great as the mopping up of said opponent by the creature. Even as a one-player game against the computer, though, it still shines. Pit your little wizard against 7 level-8 wizards and see if you can survive to the end... it can happen, but it's not easy! At the end of the day it's just a game of chance, but unless you know how to use that luck you won't succeed. It's a great game that's easy to understand, and is a fine time-filler when you're bored on the train, believe me... (it works fine on a Psion 5!).



See that Pegasus to the left being attacked by a lion and a gryphon? I'm on the back of that. Oh dear. Luckily that Skeleton there annihilated both of them and the game ended as a draw - the irony being that the skeleton in question was just an illusion!

Ian Gledhill

Chaos - Games Workshop	
Graphics	7
Sound	6
Playability	10
Longevity	10
Overall	9



Image © 1995 Eric J. Fleischer, MD

Das Spectrum & SAM Profi-Club Koln

Germany is without question one of the countries where the ZX Spectrum has the greatest number of addicts! After contacting Wolfgang, he sent us some copies of SPC Koln Magazine- here we will take a look at it.

Ok, one magazine reviewing another is always suspicious- or it would be except those who are reviewing it are the completely honest Retro Review crew!

To be honest I had already taken a look at the SPC club magazine before I received Wolfgangs copies. The mag looks quite good, the layout is quite professional, and as usual on these amateur magazines, the format is A5 black and white photocopies. The content is quite varied providing that you know that it is a Spectrum and SAM only magazine, so no other machines looked at. Articles span from encounter reports,

A Few SPC Magazines to read and translate

opinions, readers letters, hardware projects and software... you can also find some type in listings there (who here doesn't miss them?!).

The magazine is a club mag, so it is also used as a communication media for club members. The 20 or so pages give you plenty to read from- the only catch is that it is in German (although you can find some parts in english)! I had to ask a colleague to translate some for me. A nice suprise is to find some active hardware dealers on some advertisements.

Summing it up, a good magazine, pity that it is in German for English speakers, but hey it is a club mag- a *local* club mag. I'll definitely give it a thumbs up.

Where to get it :

see:

<http://www.womoteam.de>

or mail:

womoteam@t-online.de



TEXAS INSTRUMENTS TI-99/4

But where's the 'A'?

We all know that Texas Instruments had but one desktop computer in the 80's: the TI-99/4A. But what many do not realise is the TI-99/4A was one of a family, with an older brother and two younger ones, which were both never allowed out in public. Ian Gledhill takes a look at the less well-known siblings of the TI clan.

Texas Instruments - a name that is to many people synonymous with good quality hardware, both in calculators and computers - and with reason. For years they've produced well-received hardware which has usually sold well and earned TI the reputation they deserve. But has it always been this way?

To an extent, yes - they have indeed always produced good hardware. But sold well? Not quite. Say the words "Texas Instruments" and the word "computer" together and people think of the TI-99/4A, which, as eBay these days is a testament to, sold very well indeed (hence they are very cheap and very common on auction). But what about the machines that you *don't* see?

Take TI's first effort, for example: the TI-99/4. No, not the TI-99/4A, just /4. Released in 1979 at the "bargain" price of just US\$1500, it's easy to see why not many people own one. That's \$1500 in 1979 money, not adjusted for inflation. It did include a monitor at first, but as most home computers of the time could jack up straight to your television this didn't help the price much. It didn't take long for TI to see sense and release it without the monitor for a cool \$1150, but it didn't help sales much.

So it didn't sell - but was it any

good? The only answer is a definite, and absolute "kind of". Sporting a 3.3MHz 16-bit CPU (the TMS 9900) it was always going to be good at number crunching. Attached to this CPU was a huge 256 bytes of RAM. That's right, 256 bytes, not kilobytes. To program the thing in BASIC, you had to use the graphics memory, which was 18KB in size, so enough to hold a reasonable



Isn't this the TI-99/4A start-up screen? No.. take a closer look at that copyright date! 1979 is two years before the 'A' arrived.

version of Mastermind of whatever the popular BASIC game of the day was. A side effect of this was speed - TI completely failed to harness the power of the CPU in BASIC, not only by writing the interpreter for the graphics chip (really) but also by writing it in an interpreted language, the "GPL" (Graphic Programming Language). So,

to run PRINT "HI" the graphics chip (a TI9918) interprets a program which interprets the BASIC program. As you can probably tell, efficiency was not the TI-99/4's strong point when it came to BASIC. Believe it or not, this didn't change even when the much more popular 4A came out.

Right, so as far as BASIC is

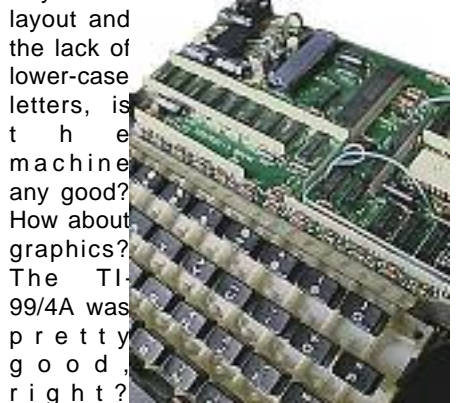


Probably the best TI-99/4 game written (which naturally runs on the /4A too). Tunnels of Doom actually comes on tape/disk and cartridge - you need both!

concerned, the TI-99/4 is a bit of a no-no. But at least the keyboard is nice, being a TI machine. Well.. it's ok actually, but it's not like the 99/4A one. It's much smaller, kind of like large versions of keys used on the TI calculators of the day. In fact, it looks like it'll be horrible to use, but is actually quite comfortable. Whether someone with larger fingers would agree with that I'm not sure - the keys are quite small, but this allowed TI to issue keyboard overlays so the user knows what each button does. For instance, SHIFT+C to stop the program running, SHIFT+Q to reset the machine etc. In their infinite wisdom, TI decided that chopping out the reset button from the design and using SHIFT+Q was a much better idea and of course nobody would accidentally press SHIFT+Q while aiming for something completely different, oh no. They weren't the only company to do this, of course (c.f. the Aquarius and it's reset key) but at least most computers had the sense to have

a get-out option (on the Aquarius press CTRL+C to break out of the reset screen). Not so here... you wanted a capital Q and reset the machine? Oops... hope you had a backup. Of course you'd not press SHIFT+Q for a capital Q anyway - you'd just press Q. There are no lower case letters on the TI-99/4! Hence SHIFT is used for everything. The keyboard has all the letters, the numbers, space, return and shift, and that's about it. No function keys, no CTRL.

But apart from the daft memory map, the small keyboard and the idiotic keyboard layout and the lack of lower-case letters, is the machine any good? How about graphics? The TI-99/4A was pretty good, right?



Remember *Hopefully you can see here the size of the keys on a TI-99/4.*

I said the *graphics They feel better than you'd think though.*

TI-99/4 was the TMS9918? The eagle-eyed and 4A enthusiasts among you will realise that the 4A used the TMS9918A chip. The difference - resolution, that's all. If you've ever wondered why the TI-99/4A couldn't use the graphics mode (256x192) in BASIC, it's probably something to do with it sharing most of its BASIC with the TI-99/4, which simply doesn't have that mode. This lack of a bitmap mode doesn't help the machine's compatibility, but most early 99/4A programs do work with the /4. Any game which uses that extra mode, though, is forever doomed to failure. To be fair, in

1979, a 256x192 colour bitmap mode would be pretty impressive for a home computer. So it's fair to say the graphics really aren't that bad for the time, and it's still perfectly capable of playing "Tunnels of Doom" which is what really matters on the TI-99 series, after all. Add to that a competent sound processor of a similar calibre to the trusty AY-3-8192 found in so many other machines (Speccy 128 etc), and you can make some pretty reasonable games.



Great for BASIC and not a lot else.. but it looks cool and it's rare so I want one!

As most of the TI-99/4 is the same as a 4A, most - if not all - peripherals will work with both, and as it's possible to buy SCSI interfaces and suchlike for the /4A, they should work on the /4 too. So it's not unfeasible that you can get your 1979 /4 onto the 'net in the same way as you do a /4A (check out the TI99 FAQ part II for more details). You'd need to modify the terminal program a bit to map all lower case letters to upper case but it'd work. Everything like the disk drive and memory expansion should fit just the same as it all goes into the PE (Personal Expansion) box anyway.

So why buy a TI-99/4? Curiosity, that's all. The 99/4A is more able and much much cheaper, not to say far easier to find too. There are very few TI-99/4s around these days - I bought mine from Brad Rosenberg for just over

130 UKP which is a bit of a bargain - the retro market in the USA rarely goes as high as here in the UK. The fact that most pictures of TI-99/4s are from Brad also means that few people have them - I wouldn't surprise me if some of the pictures around are actually of my machine! Brad has another two /4s left over but as far as I know is holding on to them both.

The TI-99/4 wasn't the only computer never to sell well, though. The TI-99/2 sold even worse. Actually, the TI-99/2 never sold at all - it was announced January 1983 at the Consumer Electronics Show in Las Vegas. It was going to wow the BASIC-programming world. At least, that was the theory. Knowing that their previous attempts at BASIC, had been rather ... "eccentric", TI went a more traditional route for their "BASIC computer"'s BASIC and wrote it in Machine Code... and it flew. In 1983, a huge 10.7MHz 16-bit CPU was powering this baby and with no bottlenecks of the graphics chip, it was blistering. Which was great. Except there was no colour - a black and white machine in 1983! And the sound capabilities were a little lacking too, in as much as they didn't exist. Graphically, there was something to be desired as you could use upper and lower case letters, but only in assembler - in BASIC you were limited to upper case letters. No user-defined graphics capability here!

The 99/2 was very much a BASIC programming machine - it was what it was meant for, and what it was good at. It did what it needed to, and it did it *fast*, and at just \$99 it could have sold many machines. Would it have sold many? We don't know - just as production was about to start large-scale, the price war became so intense, with prices plummeting on all machines, including the current TI flagship, the TI-99/4A, it

was deemed unviable economically, and the project was "put on hold indefinitely".

So what to do if you want a TI-99/2? Same thing as you should do to hitch a lift with a Vagon - forget it. It seems there's only 2 or so in private hands, so although they will undoubtedly come up for auction at some stage, don't hold your breath!

Finally there's the TI-99/8 - cross a TI-99/4A with a TI-99/2 and you get a TI-99/8. Armed with the same great horsepower as the TI-99/2, but thankfully with colour and sound (the same as a TI-99/4 with a speech synthesiser), the TI-99/8 could easily have been a contender for success in the 16 bit market. It was obviously



One could say it's twice the machine the TI-99/4A ever was... a shame the TI-99/8 was never released.

meant as a serious machine though - no cassette support as standard, no TV output as standard - it expected a disk drive and monitor. Needless to say, however, it never got past the initial prototypes, let alone close to market. Perhaps with the onset of Atari's new baby, the "ST", and with the ferocious price wars of the time, TI felt there was no room in the semi-professional market for them... whatever they felt, certainly they stuck with the TI-99/4A rather than risk a new machine.

So how should you get a TI-99/8?

Same way as a TI-99/2. There are some in private hands, and indeed one of them (the one with a key missing) sold on eBay very recently, but as could be expected it fetched a handsome price.

It's fair to say that it's possible to collect the whole TI-99 family, but it'll take a long time. But if you want interesting computers with a healthy supply of foibles then you could do a lot worse. There's hardware and software out there to get a TI-99/4A on the net using the TI as a terminal, but there's also plenty of software and hardware for other uses, like the TI-99/4A's SCSI card. Perhaps the best thing about the TI-99/4A is the price - very very cheap, at least in the US. Perhaps the worst is that if you want to code anything useful for the TI, you'll need extra hardware as the BASIC is way too slow on a /4(A) and you can't code in assembler unless you buy extra hardware like the Mini-Memory cartridge which comes with a line assembler. Perhaps look at it this way - buying a TI-99/4A is good just to give it a good home. You can't go far wrong with the prices at the moment!

We'd like to thank Fabrice Montupet of www.ti99.com for his kind permission to use photos from his collection (yes, the TI-99/2 and TI-99/8 are his!). His website is a superb reference site if you can speak French!

Check these:

www.ti99.com - Fabrice Montupet's site. Loads of great information, but have your French/English dictionary handy.

www.99er.net - American site with lots of technical info like pin-outs etc.

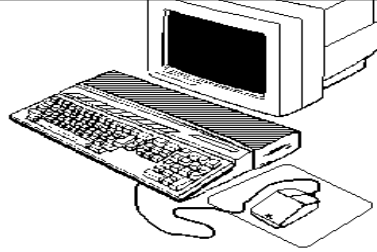
Are User Groups Still Useful?

James Alexander

This is an issue faced by many Atari users these days, in fact its something faced by all retro-computer users. Its also an issue I have a great interest in. Where I live in Toronto, Canada there are several computer user groups both for current machines and for us retro computer fans so perhaps I'm a bit luckier than some.

But I've noticed a disturbing trend in the past few years, Many Atari user groups have been shrinking and closing far beyond the rate at which the number of users has been shrinking. Let me give you a couple of examples. One group where I first noticed trend wasn't an Atari group but the local user group for the Ohio Scientific computers. As some of you remember these machines enjoyed their popularity in the early part of the 1980's, and like users of other computers all over, the OSI users managed to get a decent users group going for a number of years. But it didn't last long. Through the first half of the 80's the company was sold and the OSI computer line was discontinued. That in itself made the user group even more important to its members since there was no longer any other means of support or new software

The Atari Files:



for their computers. The users group laboured on for a few years, but gradually attendance and membership dwindled. The newsletter grew thinner from lack of new contributions then ceased publication altogether. You can guess what followed next. With a lack of participation that group was a rapidly fading memory in the few remaining OSI diehards by 1986.

Flash forward to 1992, to one weekend in May at a somewhat large (at least large to me) computer show put on by another user group. This group was 400 or so active atari users, both hobbyists and those who used Atari computers in their work. That computer show was my first encounter with any user group related event. I managed to pick up a few items for my 130XE and my recently acquired 1040STe (the same machine on which I'm writing this article). I was impressed, I felt like I'd come out of exile. No longer was I alone in finding what gear I needed at the handful of Atari dealers in town. I no longer felt like the only Atari user in town. But even then I didnt realize just how good a user group could be. I'd planned on just staying in a year to gather a bit more

knowledge and collect as much of the pd & shareware library as I could. As the months went by I found myself looking forward to going. I'd always found something useful at the meetings and I found myself making friends. The meetings were jam packed with information that helped me out with both my 8bit and ST system. Meetings seemed to be over too soon and I always waited eagerly for the next months meeting. After 5 good years of being a member of that user group the unthinkable happened. Since Atari had temporarily, later permanently exited the computer business, new hardware & software became scarce. I started noticing the same trend experienced by the OSI user group I mentioned above. Instead of having over 100 or even 200 at the monthly meetings, the attendance started dwindling. Friends I'd met started dropping out in favour of other "more popular" computers. Even the club newsletter, which had won an award in the Computer Shopper magazine a few years earlier, started to lose steam. It got thinner, and the editor became frustrated at lack of participation, spent less and less time on it. At that point in time I had become caught up with work and my college courses. I couldn't even have time to participate for a few years. Still the group held on and managed to keep going. I once again had a chance to return in the fall of 2000. But it just wasn't the same. The clubs BBS was gone. So were many of the

members, Including myself, a good meeting might have 10 people show up. If it weren't for about 4 dedicated volunteers that user group would have disappeared years earlier. The real problem was lack of participation. of the 10 people who would take part only 4 would actually keep the group going. The rest seemed to sit back and think that "someone else will keep it going and fix things up". To make a long story short that group simple faded away about a year ago. Not from a lack of Atari users in the area but from apathy. The few who had tried to keep it going eventually gave up out of frustration, from lack of feedback, lack of participation when the Atari users who actually got involved were outnumbered by a couple of noisy negativists (who were users of that, ahem, "universal operating system) who would show up at meetings and start heckling everyone. By now you've wondered what the heck my point really is. Its not complicated really. That is we need to become active in our "hobby". I use quotes cause for a few, like myself, our Atari computers are still useful working machines. Like other retro-computer owners we don't have a large number of dealers selling new machines & software hardware upgrades. This makes user groups more important not less. Yes I know a number of you are thinking to yourselves "Surely the Internet can do all that for us". Well it is quite useful for sure, but its sorely lacking as a replacement for a user group. A user group, even a small

informal one (some say those are best) having a monthly meeting can help us out as much as a month of emails. Having access to FTP sites and web pages is great too, as long as those are kept up to date. Quite often I've been frustrated looking for some piece of information or some item I need only to find has had its site shut down by the time we find it. But its the information, the hands on "how to" aspect of a user group that makes them especially good. In a 3 or 4 hour user group meeting its quite easy to learn just how to get going with Calamus, Papyrus, or some other piece of software, or how to setup your own hard disk system on a shoestring budget. So what can you do if there's no user group in your area? or if the one that was around shut down? Start one of course. It doesnt have to be difficult, it can be done with a handful of interested people. The real key is that everyone in the group gets involved doing something. That can mean becoming treasurer, software librarian, or an organizer. You can even do something simpler, write an article for the newsletter, or even editing the newsletter. Showing off some hardware upgrade or piece of software you use as a demonstration at a meeting will be more interesting to other users than you might realize. Even starting up a user group doesn't have to take a huge effort. You can start with meetings in your home. Alternatively you could find an inexpensive meeting space in a local public library, church

basement, or community centre. Those are also good places to place flyers to advertise your user group, many of them allow that sort of thing. Another place to have flyers is any electronics or computer surplus stores around town. Some of these will carry peripherals or accessories useful to Atari owners and wouldnt mind a bit extra business from a few more computer hobbyists. I remember I mentioned the internet isn't a total replacement for a user group but it can still be useful to your user group. A simple website on some of the free hosting services with news about your user group and contact information will be of great help keeping in touch with other Atari users you might not meet otherwise. Just remember to keep it up to date. If you dont, people who find it may not pay much attention if its months or years out of date. I'm not kidding about this point, I've seen intersting sites that are 3, 4 or more years without any updates and who's emails go unanswered. I've no idea of those groups are alive or what but it gives the impression of those groups being the digital equivalent of a ghost town.

Well thats my 2 cents worth. If you wanna get in touch with me you can email me at

james-m-alexander@rogers.com
I'd especially like to hear from active user groups. I'd like to compile a list of user groups to include in a future issue.

AmiWest 2002

For the fifth time, the Amiwest show went on in Sacramento. Harv Laser from Amigazone sent us his report on the show.

The fifth annual AmiWest Amiga computer show was held the weekend of July 27-28, 2002, at the Holiday Inn Northeast, and a decline in attendance from previous shows was sadly obvious. In spite of continued interest in the Amiga, and continued hopes of new hardware, (the last new Amiga model, the 1200, shipped in 1993), it's unfortunately taken on the image of a vintage, or cult platform, due mostly to the lack of new machines. While there are still Amiga dealers who sell and support the platform, significant new software titles, outside of the public domain/shareware area, are few and far between. Glossy Amiga magazines have all but vanished, except in Europe. The Amiga platform is not dead.. it's just sort of hibernating.

The reason is pretty simple: Amiga users don't want to keep pumping money into their older machines, when the new, promised 21st century machines are always "just around the



The Amigazone Stand

corner"; like a carrot on a stick, they keep chasing after it.

Amiga Inc., (<http://www.amiga.com>) the Washington-based company that took over control of the name and its heritage from Gateway Computers, in January of 2000, seems headed in different directions at once, touting it's "Amiga Anywhere", or AmigaDE platform for PDAs and Cell Phones, while overseeing development and licensing of a new generation desktop, known as



Attendance was shorter this year...



Newtek was a big name on the show

AmigaONE, a PowerPC-based machine slated to run OS V4.0. An AmigaONE motherboard mounted in a fancy custom black tower was shown by Extreme Computing at AmiWest, but alas, it was running Linux, as OS V4.0 was not yet ready to show on it, as many had hoped it would be.

Other long-time Amiga dealers and vendors such as AmigaZone, Merlancia Industries, NovaDesign, Compuquik, FWD Computing, Audio Labs, and a few more, demoed and sold their products in the show's exhibits hall.

Bill McEwen, President of Amiga Inc., in



Selling Coupons...

his banquet keynote speech, spent half an hour apologizing for the delays, another quarter hour making legal threats to companies who he claimed have stolen Amiga's Intellectual Property or done them harm in some other way, and the remainder of his presentation on AmigaDE, a portable, scalable platform that while interesting, did not seem to play well to the gathered masses, who seemed to sense that it is "Amiga" in name only, although he did later stop at every banquet table to thank those who were there for keeping the faith.

This crowd has been waiting for years for something called "Amiga" that can blow Wintel machines and Macs out of

the water, and alas, it looks like they'll have to wait a while longer. AmigaOne is now slated for a Q4 2002 release, and



Cheap LightWave

Amiga Inc. is taking "coupon/rebate" pre-orders on its web site.

Meanwhile, the last rev of Amiga OS for the "classic" hardware, Version 3.9, released a year ago is slick, powerful, intuitive, and modern. Another new twist is Amiga emulators, such as Cloanto's **A m i g a F o r e v e r** (<http://www.amigaforever.com>) which provides near perfect emulation of an Amiga on a Wintel box or laptop, far



Loads of Merchandising

exceeding the speed of the fastest "classic" Amiga running a Motorola 68060 CPU, and multitasking alongside Windows, with full transparent access to the host machine's memory, drives, and networking; a slick solution indeed, and a jaw-dropper when a long-time Amiga user sees their favorite software running

20 to 100 times faster than they're used to. Still, a new box with an Amiga logo on it is what they want, and is reason #1 why they're so reluctant to pour money into their aging hardware.

The hardcore, dedicated Amiga users and fans were at AmiWest as usual, but the show, which is organized by the Sacramento Amiga Computer Club, (<http://www.sacc.org>) was barely publicized outside a small number of internet and paper venues. This did not help bring in the big crowds, or the press, although those who could not be there physically, were treated to live Webcams (including a cam flying around on a radio-controlled blimp in the showroom) and streaming audio broadcasts, courtesy of the Amiga User Group Network (<http://ugn.amiga.org>)



Smile....

Dealers at the show *were* selling product, but to keep their families fed during this dormant period, many have branched out into other product lines. It's good to see them hanging in there, rather than giving up on Amiga entirely, as so many other companies have done.

As the only Amiga-centric show on the West Coast, and a short drive from Silicon Valley, this year's AmiWest evidenced the need for more vendors, better publicity, and most of all, new



A signed relic...

products to draw in the crowds. This writer remembers Amiga expos with thousands of people crowding the aisles, and those can happen again, once the Amiga faithful are finally delivered the new machines they have been patiently, often agonizingly waiting years for.



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Auction Watch

So here is this issues auction watch, as usual all prices are in GBP. Because of time restrains we've not been able to add as many computers this issue as we'd like, but there have still been some interesting sales made! Usually of the "L@@K R@RE ZX80" variety..

We've had to change the format a little though and merge the computers and consoles together. This is for our benefit as we're now using custom bespoke software (i.e. a quick databaser I whipped up in C).

Computers and Consoles

<u>Brnad/Model</u>	<u>Low</u>	<u>Av.</u>	<u>High</u>	<u>Qty</u>
Acetronic MPU 1000	2.50	7.17	10.50	3
Acorn A3000	5.00	12.00	21.00	11
Acorn A3010	5.00	29.15	58.90	6
Acorn A3020	3.20	15.46	41.00	13
Acorn A310	20.10	20.10	20.10	1
Acorn A4000	10.50	14.16	16.00	3
Acorn A410	21.00	21.00	21.00	1
Acorn A7000+	71.00	71.00	71.00	1
Acorn Atom	124.00	124.00	124.00	1
Acorn BBC B	5.19	23.63	37.00	13
Acorn BBC B+	102.00	102.00	102.00	1
Acorn BBC Master	5.50	46.62	84.00	4
Acorn BBC Master Compact	23.00	23.00	23.00	1
Acorn Electron	3.19	14.98	52.00	16
Acorn_A5000	41.00	41.00	41.00	1
Amstrad 464 +	15.00	15.00	15.00	1
Amstrad 6128 +	21.00	30.50	40.00	2
Amstrad CPC 464	1.70	12.23	17.00	11
Amstrad CPC 6128	6.50	17.23	33.39	6
Amstrad CPC 664	19.35	35.85	52.36	2
Amstrad GX-4000	5.50	18.28	41.00	13
Amstrad PCW 8256	18.86	18.86	18.86	1
Amstrad PCW9512	5.26	5.26	5.26	1
Amstrad PPC512	6.47	10.73	15.00	2
Apple Macintosh	42.70	137.04	213.00	4
Apple Macintosh 512K	12.50	20.81	29.12	2

Apple Macintosh Classic	7.35	27.83	51.00	4
Apple Macintosh Portable	35.52	35.52	35.52	1
Apple Macintosh Portable 4/40	142.00	142.00	142.00	1
Apple Macintosh SE	11.00	19.67	27.00	3
Apple][Europlus	41.00	41.00	41.00	1
Apple][+	36.40	36.75	36.40	2
Apple][GS	18.50	46.24	73.98	2
Apple][c	28.00	47.92	82.00	4
Apple][c+	40.50	40.50	40.50	1
Apple][e Platinum	60.45	60.45	60.45	1
Atari 1040STE	25.67	68.77	78.75	4
Atari 1040STF	10.50	31.28	71.75	7
Atari 1040STFM	10.85	56.42	102.00	2
Atari 1200XL	59.00	64.00	69.00	2
Atari 130XE	11.50	22.80	42.70	6
Atari 2600 (6 switcher)	10.50	33.57	72.00	12
Atari 2600 (Darth Vader)	20.00	20.00	20.00	1
Atari 2600 Jr.	3.00	16.98	34.01	11
Atari 400	8.41	8.41	8.41	1
Atari 520ST	14.21	15.60	17.00	2
Atari 520STFM	11.00	14.90	23.00	5
Atari 520STM	26.00	26.00	26.00	1
Atari 600XL	21.00	21.00	21.00	1
Atari 65XE	5.00	17.07	40.10	8
Atari 800	22.40	62.65	160.00	8
Atari 800XL	10.50	22.69	60.00	14
Atari Jaguar	24.00	24.00	24.00	1
Atari MegaST 2	18.50	14.77	18.50	2
Atari Portfolio	15.00	15.00	15.00	1
Atari XEGS	12.50	15.75	12.50	2
Bandai Pippin	79.00	79.00	79.00	1
CBS ColecoVision	16.00	18.75	21.50	2
Coleco Adam	14.00	21.89	37.31	3
Commodore +4	2.27	21.35	56.04	21
Commodore 128	9.00	30.00	77.00	11
Commodore 128D	12.00	50.56	102.00	4
Commodore 16	8.50	17.11	32.00	9
Commodore 64	3.00	19.04	76.00	42
Commodore 64C	3.00	14.54	26.00	38
Commodore Amiga 1000	18.00	37.71	18.00	4
Commodore Amiga 1200	15.00	34.99	104.65	43
Commodore Amiga 1500	51.00	51.00	51.00	1
Commodore Amiga 2000	28.70	43.05	73.50	6
Commodore Amiga 3000	106.76	124.25	141.74	2
Commodore Amiga 3000T	126.19	126.19	126.19	1
Commodore Amiga 3000UX	200.00	200.00	200.00	1
Commodore Amiga 4000/030	152.00	171.00	190.00	2
Commodore Amiga 4000/040	148.94	227.74	308.00	4
Commodore Amiga 500	7.00	17.07	37.72	46

Commodore Amiga 500+	5.00	17.46	28.00	14
Commodore Amiga 600	10.00	23.37	52.50	26
Commodore Amiga CD32	26.00	30.43	40.00	7
Commodore CBM 4032	50.00	50.00	50.00	1
Commodore CBM 8032	72.09	72.09	72.09	2
Commodore CDTV	49.48	50.16	51.00	3
Commodore Educator 64	159.26	159.26	159.26	1
Commodore KIM-1	97.00	146.00	195.00	2
Commodore PET 2001-8	211.50	275.11	211.50	2
Commodore SX-64	46.89	108.99	211.00	11
Commodore SuperPET 9000	136.00	136.00	136.00	1
Commodore VIC-20	5.25	20.58	66.00	26
Commodore_64GS	155.00	155.00	155.00	1
Commtron Video Brain	149.61	149.61	149.61	1
Dick Smith System 80	80.12	80.12	80.12	1
Dick Smith VZ200	15.09	15.09	15.09	1
Dick Smith VZ300	26.25	26.25	26.25	1
Digital Rainbow 100	34.97	34.97	34.97	1
Dragon 32	21.00	32.15	62.00	6
Dragon 64	138.00	138.00	138.00	1
EMS M68K	46.00	46.00	46.00	1
Epson HX-20	14.00	23.45	28.00	8
Epson PX-8	14.35	20.57	26.00	2
Epson QX-10	10.50	10.50	10.50	1
Eurocom-1	69.00	69.00	69.00	1
Exidy Sorceror	340.00	373.00	406.00	2
Goldstar 3D0	31.80	31.80	31.80	1
Grandstand Adman	21.00	23.50	26.00	2
Hanimex TVG070C	13.23	13.23	13.23	1
IBM PC jr	7.00	14.22	25.20	3
ICL OPD	200.00	200.00	200.00	1
JVC HC-7GB	38.00	38.00	38.00	1
John Sands Sega SC-3000H	24.83	39.57	58.60	3
Jupiter_Ace	207.00	207.00	207.00	1
KayPro 1	28.70	28.70	28.70	1
KayPro 10	46.01	112.25	178.50	2
KayPro 2	18.00	50.61	106.05	4
KayPro 4	8.05	18.02	28.00	2
MB Vectrex	62.00	94.46	128.50	7
Magnavox Odyssey 2	3.49	13.09	28.70	3
Mattel Aquarius	4.88	18.26	27.99	7
Mattel Intellivision	8.00	25.25	40.00	4
Memotech MTX 500	51.00	51.00	51.00	1
Mitsubishi_ML-F80	36.00	36.00	36.00	1
NEC PC FX	82.00	82.00	82.00	1
NEC PC8201	31.62	31.62	31.62	1
Nintendo Famicom	28.21	28.21	28.21	1
Nintendo Gameboy	14.26	14.26	14.26	1
Nintendo NES	25.00	34.00	46.00	3

Nintendo SNES	11.00	37.61	76.44	4
Nintendo VirtualBoy	44.27	62.13	80.00	2
Olimpik	0.00	0.00	0.00	0
Olivetti Prodest PC128	15.50	15.50	15.50	1
Open University Hektor II	52.00	52.00	52.00	1
Oric 1	36.00	39.18	41.00	4
Oric Atmos	21.00	61.50	102.00	2
Orizon-Micro	82.25	82.25	82.25	1
Osborne 1	36.40	83.20	133.00	3
Osborne OCC 2	145.25	145.25	145.25	1
PC Engine Core Grafx	67.50	72.61	77.73	2
PC Engine Turbo Grafx	75.00	75.00	75.00	1
PC Engine Turbo Grafx Express	110.00	110.00	110.00	1
Panasonic 3D0 FZ-1	51.00	51.00	51.00	1
Panasonic 3D0 FZ-10	31.00	31.00	31.00	1
Panasonic CF2700	35.00	35.00	35.00	1
Panasonic RL-H1400	11.21	11.21	11.21	1
Philips CDi 205	28.00	28.00	28.00	1
Philips CDi 210	30.69	46.34	62.00	2
Philips CDi 220	21.01	37.34	60.00	3
Philips CDi 450	28.00	28.00	28.00	1
Philips Videopac G7000	11.00	17.39	30.00	5
Pioneer PX-7	41.00	41.00	41.00	1
Psion Workabout	72.00	72.00	72.00	1
Radofin Aquarius	6.97	20.63	34.29	2
Robik	48.97	48.97	48.97	1
SNK NeoGeo CD	102.00	102.00	102.00	1
Sega Game Gear	13.10	13.10	13.10	1
Sega Master System	20.00	24.75	32.00	4
Sega Master System II	9.51	15.25	21.00	2
Sega MegaDrive II	16.00	16.00	16.00	1
Sega Saturn	17.03	18.84	20.66	2
Sega_3000	15.04	15.04	15.04	1
Sega_Megadrive	6.50	6.50	6.50	1
Sekon	72.00	72.00	72.00	1
Sharp MZ-700	16.00	52.10	82.50	5
Sharp PC-1500	7.00	28.83	42.50	4
Sharp PC-1501	20.00	20.00	20.00	1
Sinclair QL	21.00	55.83	102.00	6
Sinclair Spectrum +	9.00	22.32	74.00	38
Sinclair Spectrum +2	10.00	26.63	62.00	33
Sinclair Spectrum +2A	10.50	22.40	39.00	12
Sinclair Spectrum +3	8.00	33.29	75.00	13
Sinclair Spectrum 128K	35.00	60.27	102.00	11
Sinclair Spectrum 16K	21.00	38.33	52.00	3
Sinclair Spectrum 48K	4.00	31.37	88.00	64
Sinclair Z88	16.00	30.70	51.00	7
Sinclair ZX80	55.48	201.16	425.15	13
Sinclair ZX81	2.50	37.58	80.00	34

Sony Hit-Bit HB75B	22.00	30.00	39.00	3
Spectravideo SVI 728	56.41	56.41	56.41	1
Tandy 1000 HX	7.35	7.35	7.35	1
Tandy 102	19.01	33.90	60.00	14
Tandy 600	34.14	34.14	34.14	1
Tandy TRS-80 Color Computer	8.02	21.92	46.94	10
Tandy TRS-80 Color Computer 2	6.99	14.31	28.00	15
Tandy TRS-80 Color Computer 3	10.85	24.78	53.20	8
Tandy TRS-80 MC-10	13.50	19.07	29.40	3
Tandy TRS-80 Model 100	14.00	39.19	89.25	17
Tandy TRS-80 Model 4	18.20	18.20	18.20	1
Tandy TRS-80 Model 4D	98.00	98.00	98.00	1
Tandy TRS-80 Model 4P	7.42	36.40	71.75	6
Tandy TRS-80 Model I	35.70	53.72	35.70	2
Tandy TRS-80 Model I (w/keypad)	18.20	95.43	214.20	3
Tandy TRS-80 Model II	73.81	73.81	73.81	1
Tandy TRS-80 Model III	6.93	22.99	36.17	6
Tandy TRS-80 PC2	22.75	50.64	92.76	3
Tandy TRS-80 PC4	23.10	57.55	92.00	2
Tandy TRS-80 Pocket Computer	15.67	23.69	36.40	5
Tandy_1000_SX	86.45	86.45	86.45	1
Tandy_200	23.77	23.77	23.77	1
Tatung Einstein	60.00	60.00	60.00	1
Texas Instruments TI CC-40	43.00	43.00	43.00	1
Texas Instruments TI99/4	7.36	70.68	134.00	2
Texas Instruments TI99/4A	3.85	17.36	42.70	27
Texas Instruments TI99/4A (Mk. II)	1.40	12.92	37.50	12
Thomson MO6	24.59	24.59	24.59	1
Thomson TO9	21.00	21.00	21.00	1
Timex Computer 2048	71.98	106.86	141.75	2
Timex Sinclair 2068	17.55	34.25	53.00	3
Timex Sinclair TS1000	3.36	21.08	80.15	28
Timex Sinclair TS1500	25.20	37.79	53.20	3
Tomy Tutor	72.50	72.50	72.50	1
Toshiba HX-10	10.00	21.83	41.00	9
Unipolbrit 2068	156.00	156.00	156.00	1
VTech Laser 128	6.99	17.84	28.70	2
VTech Laser 50	10.49	10.49	10.49	1
Worlds of Wonder Action Max	10.00	10.00	10.00	1
Yamaha CX5M	22.00	23.60	25.20	2

In Next Month's Retro Review

Treasure Hunting

Jorge Canelhas is going out how to find vintage hardware- a field trip and guide on how to obtain those oldies we all love!

Emulator Writing

Ian Gledhill will continue to teach us all how to write our own emulator - the CPU is next!

Chat with Michael Batallina

Amigazone has given us exclusive permission to print the transcript of a live chat with Amiga Forever Creator Michael Batallina!

Upgrading your Amiga

The final chapter in this series- we will round it up and configure a TCP/IP stack on it!

And much much much more, stay tuned...

Retro Review

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